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Grey Towers, Gifford Pinchot's former home, is a national historic landmark and is being managed to preserve and honor the invaluable contributions of Gifford Pinchot to forestry and conservation. Today the Pinchot Institute for Conservation Studies is located at Grey Towers. It's purpose is to further conservation programs of the Forest Service and other conservation agencies through research and training. The Institute will contribute to long range management of the environment by conducting conferences to improve technology transfer, environmental education, urban forestry, and policy formulation, and by developing and implementing programs to improve public understanding of conservation principles.

TECHNOLOGY TRANSFER: LATERAL DIFFUSION OF INNOVATION IN FOREST RECREATION PLANNING AND MANAGEMENT

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Final Report Prepared for the Southeastern Forest Experiment Station and the Pinchot Institute for Conservation Studies

May 1980

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May, 1980

FINAL REPORT PREPARED FOR
THE SOUTHEASTERN FOREST EXPERIMENT STATION
AND THE GIFFORD PINCHOT INSTITUTE,
U.S. FOREST SERVICE,
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INTRODUCTION

An innovation, as defined by Rogers and Burdge (1972), is an idea, practice, or object perceived as new by an individual. Technology transfer refers to the diffusion of an innovation, or the rate and extent of an innovation's acceptance and use (Orr, 1979). Technology transfer research seeks in part to answer the following question: What are the factors which appear to influence the diffusion of an innovation within a particular social system?

Of particular interest to researchers trying to better understand the factors which appear to influence the technology transfer process are the personal and behavioral characteristics of the potential adopters of the innovation. Researchers have discovered that examination of the decision process of the potential adopter as he/she gathers information about and evaluates an innovation can be most helpful in understanding the diffusion-adoption process (Rogers, 1962). It is felt that if such behavior can be better understood, researchers and administrators from many different fields would be more effective in transferring newly developed ideas or technology to field personnel and actual application.

Muth and Hendee (1979) point out that the need for more effective transfer of information to field personnel became a critical concern for the U.S. Forest Service in the early 1970's when the U.S. General Accounting Office studied the extent of diffusion of ten research findings which Forest Service administrators felt could be used advantageously by personnel in the field. The General Accounting Office found that "...while some innovations were being applied on some Ranger Districts,

not one was being used Service-wide, and two had not been implemented at all." Further evidence of interest in the improvement of this transfer process, of communicating information about innovations developed in research or management within the Forest Service specifically and the scientific community in general, exists in the large volume of documented concern by managers and researchers from the late 1960's to the present (Macon, 1967; Reidel, 1970; Walker, 1972; Blatchfor, 1972; Jindra, 1972; Smith, 1972; Schweitzer and Randall, 1974; Wenger, 1975; Staobler, 1975; Saxton, 1977). This concern centered upon greater cooperation between researchers and managers and the development of better communication techniques to ensure more efficient transfer of technology.

Partially in response to these early expressions of concern by the researchers and managers, the Forest Service has become committed to support efforts aimed at understanding the current process of information exchange within the agency and to work to improve the overall effectiveness of the process (Jay, 1973; Haug, 1976; Haug, 1978; Muth and Hendee, 1979; USDA Forest Service, 1979; Muth and Hendee, 1980). The research reported here reflects the Forest Service's and the scientific community's continuing interest in further understanding the diffusion process in the Forest Service social system.

The scope of this research effort does not attempt to identify all factors influencing the diffusion of all innovations in the Forest Service. It is rather intended to study in depth one particular innovation developed in the Forest Service research function and considered to be relatively advantageous to field personnel who may decide to use it. For this one innovation, information has been gathered primarily

regarding the human components of its spread throughout the Forest Service. The intent of this report is to provide some insight into those personal and behavioral characteristics which appear to most influence the rate and extent of spread of a particular type of innovation. In order to do this, data were gathered on several attributes and the behavior of the adopters of the chosen innovation. A small sample of non-adopting personnel were also contacted to provide a basis for comparison. It is, in addition, hoped that the diffusion process exhibited by the study innovation is somewhat representative of the process that all management and planning innovations undergo in spreading through the Forest Service.

Overview of Research Report

The purpose of the preceding discussion is primarily to introduce the unfamiliar to the concept of technology transfer. Secondly, the intent is to illustrate the flow of events within the Forest Service leading to support of this particular research effort. The third and final purpose is to create in the reader an awareness of the actual scope, or overall goal of this report.

Chapter 2 will contribute three things to the accomplishment of the overall goal of this report. First, nearly 50 years of diffusion-adoption research, leading to Forest Service interest in the subject, is reviewed. Of primary consideration here is the development of a list of variables considered to be important in the diffusion-adoption process, based primarily upon research on the spread of agricultural innovations in rural populations of the United States. Secondly, some contributing efforts by Forest Service-sponsored research are summarized

in order to present to the reader a foundation for the current study. And thirdly, on the basis of the information isolated from the review of both general and Forest Service-specific technology transfer literature, the study hypotheses are listed.

Chapter 3 addresses the selection of the innovation on which this study is based. Included is a background on the development and introduction of the chosen innovation as well as a listing of some intrinsic characteristics of this innovation that must be considered when applying previously accepted research methodology and results to its study.

In Chapter 4 the system of data collection is explained and justified. Also, the primary methods of data analysis are listed and related to the data collection process used. The measurement instrument is also described and discussed here.

Chapter 5 presents the study findings by addressing the specific study hypotheses. It also discusses general findings in adopter behavior and personal characteristics which were not specifically hypothesized but were apparent from further data analysis.

Chapter 6 is the summary chapter. Its purpose is to summarize the findings regarding new insight into the diffusion process within the Forest Service. Also included are management implications and recommendations for further research.

LITERATURE REVIEW AND HYPOTHESES

Initial Efforts

Contributions to the development of a diffusion-adoption model date back over 50 years (Muth and Hendee, 1980). Rural sociologists in the 1940's (Ryan and Gross, 1943) aroused increased interest in studies of diffusion and adoption of innovations when they seized an opportunity to investigate the spread of an innovation in the rapidly advancing farming society of the American Midwest. Those of us who readily acknowledge the benefits provided by hybrid seeds today may find it difficult to imagine a time when people were still skeptical of their value. In this landmark research in 1943, however, Ryan and Gross reported that almost all of the Iowa farmers in their study had heard about hybrid seed corn before even a few had acknowledged its benefits.

Ryan and Gross (1943) found that differing levels of importance were attached to various sources of information about the innovation. For the study population in the hybrid seed corn research, almost one-half of the farmers cited personal contact with salesmen as their earliest source of information. Only 14.6 percent named their neighbors as the initial source. However, when the farmers were asked which source of information about the innovation was most influential in their decision to adopt, neighbors were cited more frequently than any other source.

Later work by Rogers and Beal (1958) and Rogers (1962) on isolating the important factors of the adoption period of the diffusion-adoption process was successful in confirming the various stages a potential adopter proceeds through from initial awareness to adoption or rejection

of an innovation. Mason (1964) built upon Rogers and Beal's (1958) five stage adoption process--awareness, interest, evaluation, trial, adoption --and tried to isolate the important information sources for each stage. Studying the diffusion and adoption of three farm practices in an Oregon county, he was able to find significant differences in the types of information sources utilized during the various stages of the adoption process. He concluded by reporting that (1) the use of mass media sources was higher at the awareness stage than for any other information source; (2) the use of mass media sources was lower than all other sources at the final adoption stage; (3) use of authoritative, peer, and commercial sources increased as farmers passed through the stages of the adoption process.

Numerous other researchers (Dimit, 1954; Marsh and Coleman, 1955; Rogers, 1956; Beal et al., 1957; Copp et al., 1958; Rogers and Beal, 1959; Loy, 1969; Holden, 1972; Globe et al., 1973; Lin, 1975) also contributed to diffusion-adoption research. It is the combined effort of these and other researchers that has produced what is today commonly accepted as the "classical diffusion-adoption model."

The Classical Diffusion-Adoption Model

This model describes the behavior inherent in the spread and adoption of innovations. It is not a model for diffusion of technology, but rather strives to explain the human behavior phenomena that technology transfer strategies must inevitably address (Muth and Hendee, 1979). It explains (1) how diffusion and adoption vary with the characteristics of the innovation. This model offers five characteristics of innovations which may influence the rate and extent of diffusion and

adoption. These are the relative advantage of the innovation offered to the potential adopter; compatibility of the innovation with the attitudes, values, beliefs, and needs of potential adopters; complexity of the innovation; trialability of the innovation; and the observability of the innovation when put into practice.

The model illustrates (2) the five stages that an individual progresses through in the diffusion-adoption process (Figure 1): (a) awareness--the individual first becomes aware of the existence of the innovation; (b) interest--the individual seeks out additional information in an effort to decide whether the innovation provides solutions to some of his or her needs; (c) evaluation--the individual mentally tests the innovation and weighs the benefits and costs, relative advantages, complexity, and trialability; (d) trial--the individual tries out the innovation, usually on a limited scale; and (e) adoption/rejection--the individual decides to use the innovation on a continuing basis or to reject it.

The model also attempts to (3) explain the relationship between two general types of communication and the diffusion-adoption process. Compilation of previous research tends to confirm that both mass media and personal communications are important in the decision process. While mass media contacts have been shown to be most effective in stimulating initial awareness, personal contacts are the most important in the trial and adoption stages.

Not only does the model attempt to explain the individual's progress through the diffusion-adoption sequence, but (4) it also offers a convincing illustration of the progression of an innovation toward

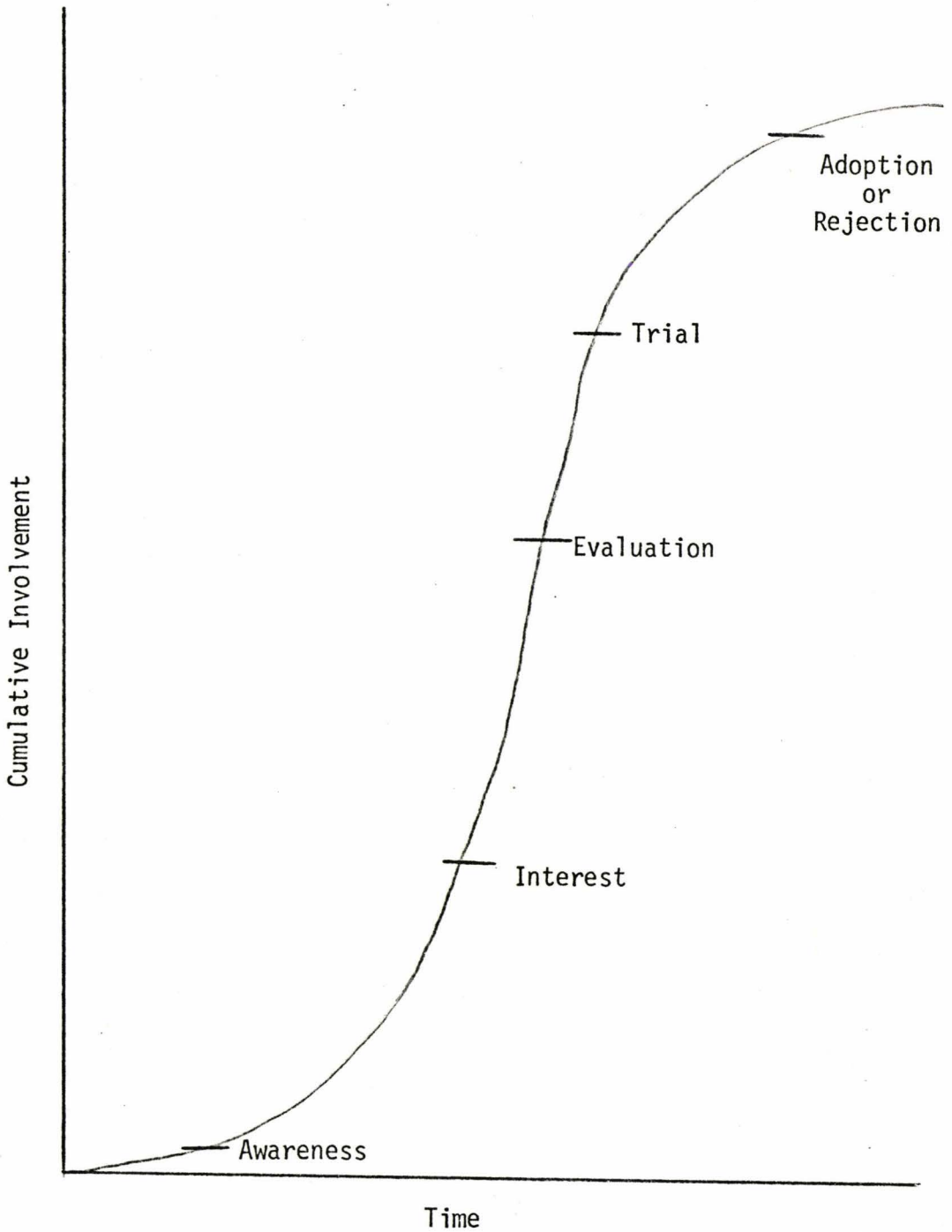


Figure 1. The progress of an individual through the diffusion-adoption process (adapted from Havelock, 1969).

acceptance in a particular society. This progression is illustrated by a breakdown of the social system into categories of individuals based upon how quickly they adopt an innovation relative to other members of their particular social system. As Figure 2 illustrates, the innovation tends to progress through the system in the following manner: adoption first by the innovators (2.5 percent of the population), then by the early adopters (13.5 percent), the early majority (34 percent), the late majority (34 percent), and last by the laggards (16 percent) (Rogers and Shoemaker, 1971). Table 1 from Muth and Hendee (1979) summarizes research findings regarding the personal and behavioral characteristics of earlier adopters compared to later adopters.

The fifth and final element of the model is the importance of the characteristics of the social system itself in which the innovation is being studied. Important factors here which could influence the diffusion of an innovation are the structure of the social system, e.g., the formal and informal hierarchies of status and position; the established norms of the social system, e.g., traditional vs. progressive; and the size and composition of the units of the social system, e.g., one person, a staff, a community (Muth and Hendee, 1979).

The Diffusion Component

The study reported here does not examine the applicability of the entire classical diffusion-adoption model to technology transfer within the U.S. Forest Service. It rather concentrates on the diffusion component of this model and existing factors within the Forest Service social system which may influence this diffusion process. Distinction may be made between the diffusion of innovations and technology transfer,

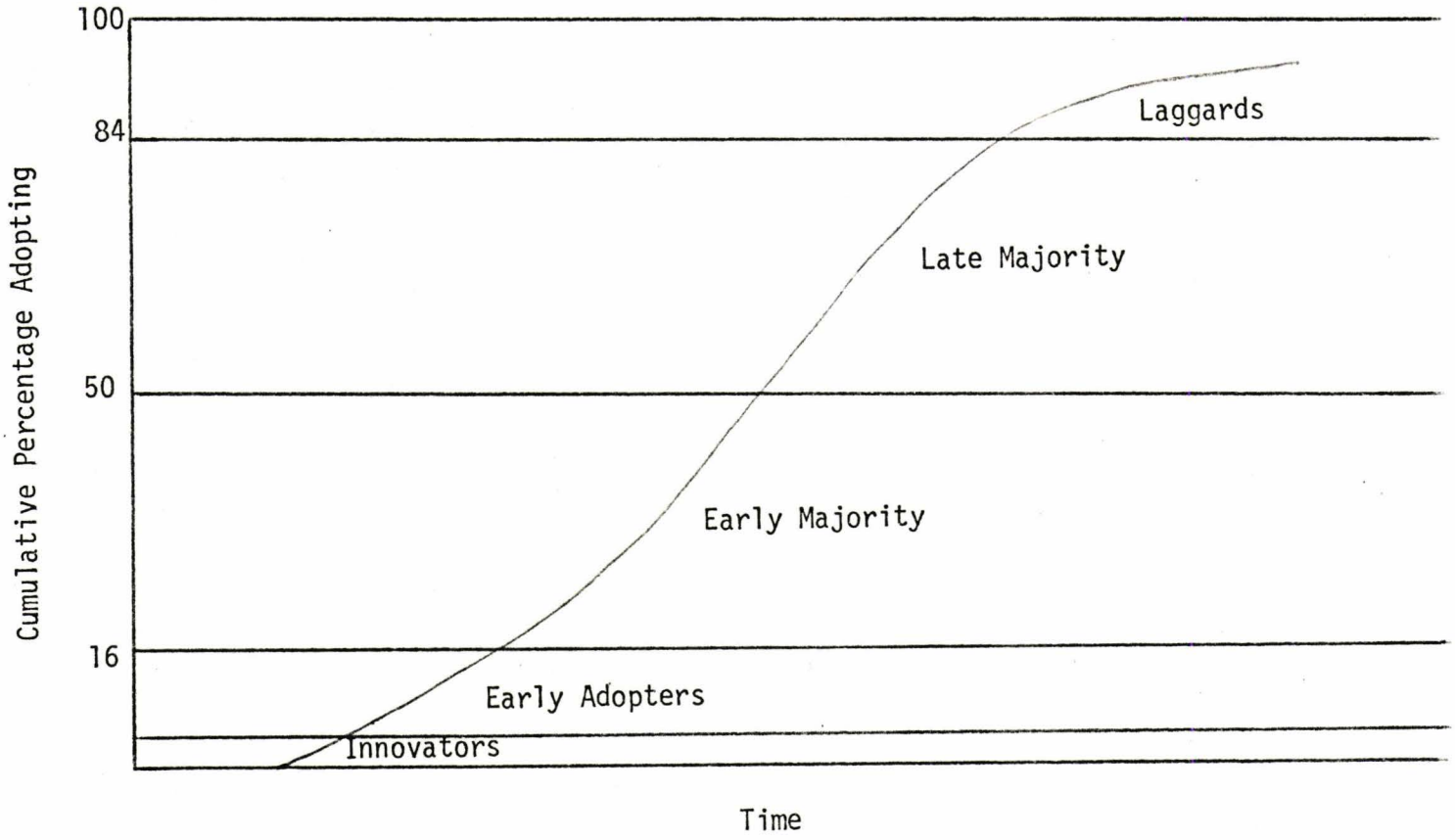


Figure 2. Adopter categorization plotted as a cumulative curve (adapted from Havelock, 1969).

Table 1. Earlier adopters compared to later adopters.[1]

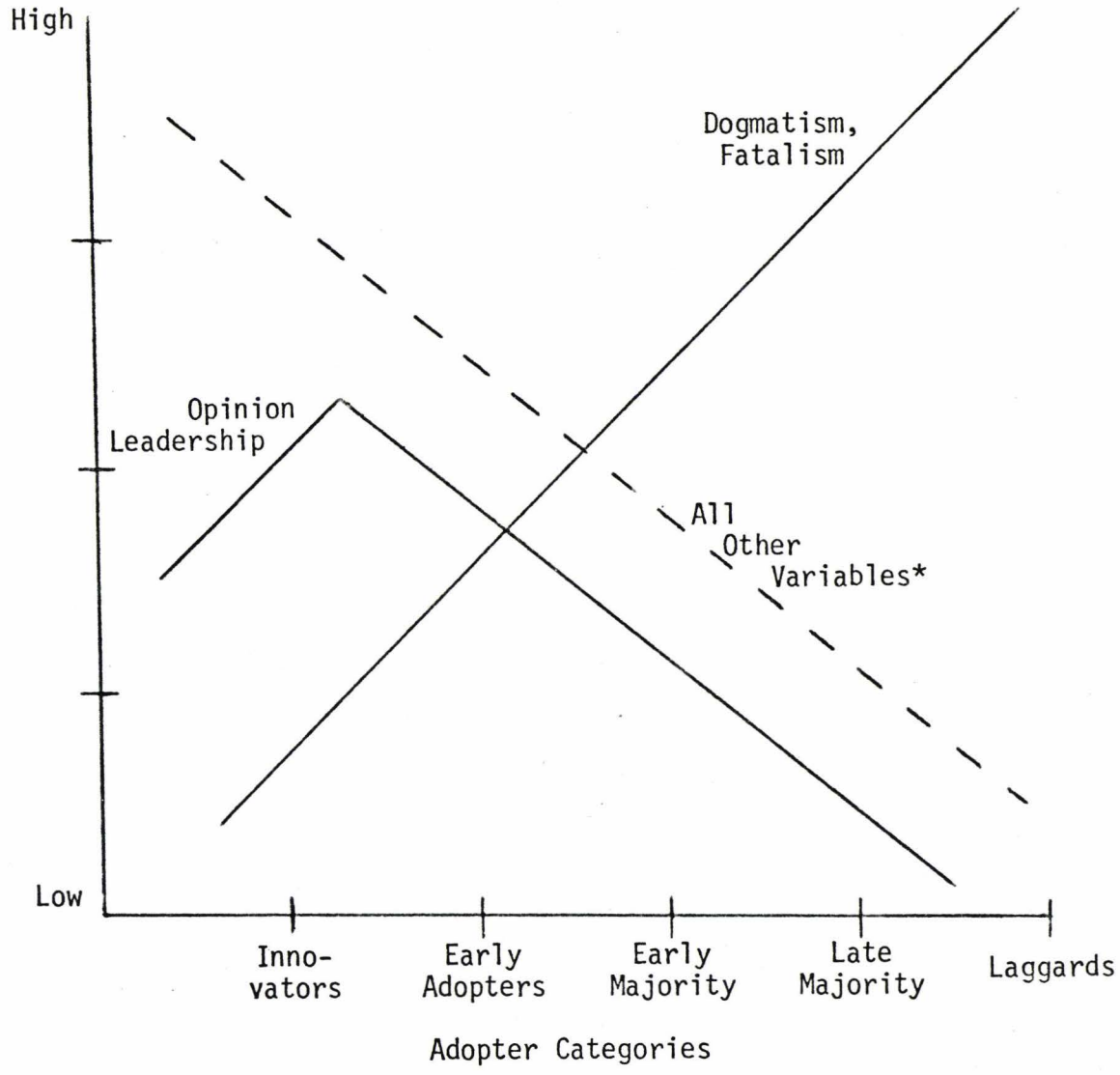
Human Dimensions	Traits of Earlier Adopters
Social-Economic Characteristics	More education More literate Higher social status Greater upward social mobility Larger sized units (farms, etc.) Commercial, economic orientation More favorable attitude toward credit More specialized operations
Personality Characteristics	More empathetic (ability to see oneself in others' position) Less dogmatic More abstract ability More rational More favorable attitude toward change More favorable attitude toward science Less fatalistic Higher motivation toward achievement Higher aspirations (for education, occupation, status, etc.)
Communication Behavior	More cosmopolitan (outside contact) More contact with change agents More exposure to mass media More interpersonal communication channels Seek more information about innovations Greater knowledge of innovations More opinion leadership More likely in social systems with modern vs. traditional norms More likely in well-integrated social systems

[1]Adapted from Muth and Hendee (1979).

in that technology transfer refers to the purposeful movement of knowledge from developer to user, whereas diffusion of an innovation may involve conscious or non-conscious spread of new ideas or practices (Orr, 1979).

Yin (1978) speaks of the "classic diffusion approach" as a social interaction approach. This approach to understanding the diffusion process focuses on communication processes among social networks and views diffusion as a process of learning among individuals. Given this view, individual innovativeness appears to be a key factor in the spread of an idea or technique through a social system. One problem with research of this sort is to determine which variables influence individual innovativeness within a particular social system. The number of such variables is perhaps 50 or 60 (Roessner et al., 1979). Rogers and Shoemaker (1971) have identified various demographic and socioeconomic characteristics which they believe to influence innovative behavior. Some of these are: age, education, social status, dogmatism, attitudes toward risk, social participation, cosmopolitanism, and exposure to interpersonal communication channels. Figure 3 illustrates how these characteristics affect time of adoption. Typically about two-thirds of the studies support the importance of these variables; the remainder do not support them (Roessner et al., 1979). The individual researcher must identify the key variables and formulate study hypotheses on the basis of the unique nature of his particular social system and his study subjects.

A major aspect of the social interaction approach, possibly a reflection of individual innovativeness, is the channel of communication



*These variables include age, education, social status, social participation, cosmopolitanness, exposure to interpersonal communication channels.

Figure 3. General relationship of demographic and socioeconomic variables with innovativeness.

through which information about an innovation travels to the potential adopter. In the classical diffusion-adoption model the two basic types of communication channels (mass media and interpersonal channels) and their relative importance are outlined. Recent work, however, has found other channels to be influential in the diffusion process.

Lin and Burt (1975), working in El Salvador on a mass immunization campaign, discovered the importance of "local media" in the diffusion of innovation. Local media, as defined by Lin and Burt, is like mass media in that it is able to reach a large audience. However, unlike mass media, it can be customized to provide messages to specific groups or geographical areas. In this characteristic it resembles interpersonal communication. Table 2 summarizes the differences between local media, mass media, and interpersonal communication.

What Lin and Burt called the local media channel appears particularly applicable to the diffusion of innovation within a large, echelon-type organization like the U.S. Forest Service. The U.S. Forest Service manages land in all geographic regions of the country, and these regions differ in their resource characteristics and management problems. Administratively, the Forest Service attempts to provide public goods and solve resource problems through an organization that includes regional, forest, and district offices. If information on an innovation can be initiated at the regional level and customized to the needs of the forests and districts in the region, the innovation may be adopted by more individuals and more quickly than it might be through use of just mass media or interpersonal communication.

Table 2. Three types of communication channels.[1]

Characteristics	Mass Media	Local Media	Interpersonal Sources
Speed to a large audience	High	Moderate	Low
Message uniformity to a large audience	High	Moderate	Low
Exposure to source	Indirect	Direct	Direct
Ability to select audience	Low	Moderate	High
Ease of feedback	Low	Moderate	High
Customizing the message	Low	High	High
Ability to overcome selectivity process	Low	Moderate	High
Usual function in the diffusion	Information	Information and/or Influence	Influence

[1]From Lin and Burt (1975).

Previous Research on Technology Transfer in the Forest Service

Jay (1973) examined the background of the current technology transfer efforts of the Forest Service. Beginning with the creation of the Forest Service, Jay (1973) documented the initiation of research interests in the agency and efforts to coordinate research and management functions. He isolated six characteristics of the agency which appeared to impede the diffusion of research conclusions: (1) simple psychological resistance to change; (2) breakdown in communications; (3) leadership behavior; (4) interest values; (5) structure; and (6) reward patterns.

Another of Jay's (1973) principle objectives was to pinpoint positive action alternatives that would facilitate increased use of research conclusions through overcoming the barriers in the organization cited above. The 15 alternatives identified called for changes in strategy, organization, collaboration, linkage, problem formulation, and communications.

Haug's (1976) research was more directed toward understanding of current technology transfer processes in the Forest Service. Specifically, he intended to study the process by which change occurs with a particular focus on the individual, his characteristics and actions.

Through the use of telephone interviews, Haug (1976) contacted 46 persons on 18 National Forests in the Pacific Northwest Region of the Forest Service. In this interview Haug gained information concerning the adoption of small desk-top computers in each of the National Forest Supervisors' offices. His findings presented a foundation from which

to work in trying to better understand the diffusion process in the Forest Service.

Haug (1976) reported the diffusion process of desk-top computers in Region 6 of the Forest Service could be divided into three distinct stages. In the initial or exploratory stage, the innovative adopters tended to have a particular problem in mind for which the innovation offered a significant possibility for solution. At the emergence of the second or expansive stage, the technology had already been demonstrated to be applicable to operational problems. Adopters during the final or saturation stage tended to observe the use of computers on other forests and proceeded with what might be regarded as a rational decision-making process. These individuals focused on finding uses for the technology rather than solutions to problems.

In addition, Haug found that: (1) it could not be substantiated that the use of external information sources varied with stage of diffusion; (2) educational institutions were an important information source for nearly half the adopters of the innovation; (3) work experience outside the Forest Service was not a factor in the adoption of the computers; (4) early and late adopters were undifferentiated by their educational background; (5) age was not a basis for discriminating between early adopters and late adopters; (6) total professional experience of early adopters did not differ from that of later adopters; (7) earlier adopters viewed the innovation as a solution to current management needs, and late adopters tended to respond to technology push rather than demand pull.

In their summary of the classical diffusion-adoption model

described earlier in this report, Muth and Hendee (1979) illustrated key elements of the model with forestry examples. In this presentation recent technology transfer literature dealing specifically with innovation in forestry was reviewed and a list of forestry innovations along with their relative stages of adoption were compiled. Muth and Hendee (1980) have continued to relate the applicability of the classical model to the forestry profession. They have also pointed to recent developments in forestry which indicate increased commitment to technology transfer and have called for development of programs which will encourage rapid spread of the best available technology in forest management.

Review

Through a review of the literature the origin and some contributing efforts to the classical diffusion-adoption model and its accepted elements have been examined. From this model a definition of the diffusion component has been extracted. Some of the critical elements of this component for study of the Forest Service technology transfer process have been identified.

The recent forestry technology transfer literature provided a description of the management and research relationship that exists in the Forest Service (Jay, 1973). It also has identified some human behavioral components previously found to be important in diffusion research in one region of the Forest Service for one particular type of innovation (Haug, 1976). Current interest in improved technology transfer in the Forest Service has also been demonstrated (Muth and Hendee, 1979; Muth and Hendee, 1980).

Study Hypotheses

Based upon the information gained through review of the literature, including the classical diffusion-adoption model and recent studies on diffusion of forestry innovations, the following study hypotheses regarding diffusion of innovation in the Forest Service have been formulated:

1. Initial awareness of the management innovation by the adopting individualswas more often stimulated by mass media than by other communication channels.
2. After initial awareness, the potential adopters placed equal reliance upon mass media and personal communication channels to seek more information about the innovation.
3. The potential adopter's age, years with the Forest Service, and time in position have no relationship with decision to adopt or not adopt the innovation.
4. Accessibility to communication elements and the degree of cosmopolitanness of the potential adopter have significant, positive relationships within decisions to adopt innovations.
5. Adopters who differ in time of adoption vary also on their personal and situational characteristics.

Additionally, due to expressed interest in examining any differences in the technology transfer process of the various Forest Service regions and the need to examine the overall Forest Service technology transfer process in its basic components, the following two hypotheses were formulated:

6. Communication channels determined to be important for the adopters

in the initial awareness and information-gathering phases of the decision process vary by Forest Service region.

7. The length of time from development of the innovation to application in the field varies by Forest Service region.

THE STUDY INNOVATION

Selecting the Innovation

The overall goal of this research was to gain insight into the diffusion process which occurs as an innovation spreads through the Forest Service. Upon consultation with several Forest Service research scientists, it was decided that the best way to study this diffusion process would be to select one forestry innovation and determine how it spread from development to application.

The next decision to be made was which innovation to study. After consideration of several possible innovations, consultation with Forest Service researchers, and initial contact with Forest Service managers, an agreement was reached to study the diffusion of the Code-A-Site campsite inventory system. The Code-A-Site process for inventory of dispersed campsites seemed a particularly good study innovation for a variety of reasons. Foremost, Code-A-Site is still a relatively new concept to the Forest Service as a whole, and is considered by many researchers and managers to be an innovation. That is, it is a new technology apparently providing some advantage over old inventory systems and is being accepted and applied by field personnel. Also, the fact that Code-A-Site is fairly new in application suggests that the circumstances surrounding its spread could be quite easily recalled by those involved.

Further justification for the selection of Code-A-Site lies in its development by research scientists within the research branch of the Forest Service. This factor makes it seem reasonable to assume that the channels through which Code-A-Site has passed could be more

easily isolated than if the source was outside the Forest Service. Also, this is an innovation which is still spreading in the Forest Service. Managers are still discovering the applicability of this technology and planning for its initiation. Apparently, no other innovation available to Forest Service managers has superceded Code-A-Site and thus influenced the rate and extent of diffusion.

Code-A-Site

Prior to study of the diffusion process of an innovation, it is important to examine the innovation itself. The efforts of this research are centered about the communication channels used in the diffusion process and the personal and behavioral characteristics of the potential adopters. The classical model, however, indicated that there may be characteristics of the innovation itself which may help explain the diffusion process it undergoes. For this reason a brief account of what Code-A-Site is, where and when it was developed and tested, and how it was apparently made available to the rest of the Forest Service is included here.

The Code-A-Site process makes use of edge punch cards and a codebook for recording basic information about dispersed campsites along forest roads, in backcountry, and in wilderness. These campsites, whether established through design and planning by managers or by impromptu use by campers, are a focal point for recreational use and related environmental and social impacts (Brown and Schomaker, 1974). Adequate information about the number, character, and location of these sites may be useful for dispersed recreational planning and management and for research on their use (Hendee et al., 1976).

Those responsible for the development, testing, and publication of Code-A-Site (Hendee et al., 1976) list the following as potentially useful questions which may be answered through the use of Code-A-Site:

1. How many and what kind of dispersed recreational sites exist on a particular road system, in backcountry, or in a wilderness unit?
2. What is the overnight capacity of the area without forcing development of additional impromptu campsites?
3. What proportion of sites have sustained different degrees of environmental impact?
4. What are the locations of sites that offer particular kinds of experiences?
5. Which sites have shortages of critical resources for different uses?
6. Which sites have management problems or need work, where are they, and what is the problem?
7. What proportion of the sites fall within certain standards that might be established to control capacity, quality of experience, or environmental and social impacts?
8. What sites are attracting the most use and the least use?
9. What are the common characteristics of the overused and underused sites?
10. What changes occur at the sites over time?
11. How much dispersed use occurs?
12. Where are sites located?

Through examination of the information that can be gathered by the Code-A-Site inventory it becomes apparent that this system has potential beyond simply recording the existing characteristics of

campsites. Code-A-Site is designed in such a way as to provide a continuing inventory system enabling managers to monitor changes in sites and the creation of new sites over time (Hendee et al., 1976).

Some of the specific information which can be recorded about each campsite includes location, capacity, available resources such as firewood, water, forage, and scenery; measures and estimates of the degree of environmental impacts; site facilities such as toilet, table, fireplace, or make-shift visitor-constructed improvements; proximity to other campsites; available activities and attractions; needed work at the site or other management recommendations; judgments about the amount of use the site receives; site map; and space for recording other information a particular manager might desire (Hendee et al., 1978). Built into this inventory system is flexibility for each user. Whether the manager wants only to know how many campsites exist in an area, to identify those sites needing maintenance attention, or to provide detailed information to campers to aid in the campsite selection process, Code-A-Site is readily adoptable to any of these uses.

The first step in a Code-A-Site inventory is the initial identification of the sites by field personnel. When a site is discovered, the inventory of the relevant variables is made and recorded in the appropriate spaces on the Code-A-Site card (See Appendix A). At a later time, in the office, the edges of the cards must be punched where they have been coded to enable needle sorting of the cards. At this point the collated data may be analyzed by the manager in order to aid in decision-making.

Field Test and Publication

During 1974 and 1975, field testing of Code-A-Site was conducted at several Forest Service locations within Region 6, the Pacific Northwest Region. In the Mount Baker-Sequoia National Forest in Washington, testing was conducted on the White River and the North Bend Ranger Districts. Testing also occurred during this period on the Bend Ranger District of the Deschutes National Forest, on the Ellensburg and Naches Ranger Districts of the Wenatchee National Forest, and the Clackamus and Estacada Ranger Districts of the Mount Hood National Forest (Hendee et al., 1976; Hendee et al., 1976).

A summary of information gathered during the first year of field testing was originally presented by the authors at a Multiagency Workshop, "New Perspectives on Recreation Resource Management," March 8-12, 1976, in Bend, Oregon. Results of the field testing were then published by Hendee, Hogans, and Koch as a USDA Forest Service Research Note, PNW-280, October, 1976, "Dispersed Recreation on Three Forest Road Systems in Washington and Oregon: First Year Data." Also published in 1976 was the USDA Forest Service Research Paper, PNW-209, by Hendee, Clark, Hogans, Wood, and Koch. This manuscript, entitled "Code-A-Site: A System for Inventory of Dispersed Recreational Sites in Roaded Areas, Back Country, and Wilderness," included a brief introduction to Code-A-Site, its purpose, field testing, and an instruction manual for completing the Code-A-Site inventory card.

Beyond these two publications, available through the Pacific Northwest Forest and Range Experiment Station, the Code-A-Site process has not been extensively published. The Research Paper PNW-280 was

referenced in an article in the Journal of Forestry by Downing and Moutsinas (1978); and the use of Code-A-Site, some results from its application in some Forest Service areas, and an illustration of the inventory card itself were included in the 1978 textbook, Wilderness Management, USDA Forest Service Miscellaneous Publication No. 1365, by Hendee, Stankey, and Lucas. Additionally, Code-A-Site has been presented to U.S. Forest Service field personnel and administrators in several training sessions and workshops.

How Code-A-Site Might Differ from Other Forest Service Innovations

In considering how relevant the conclusions drawn from the diffusion process of Code-A-Site might be to other Forest Service innovations, it is necessary to first determine how the intrinsic characteristics of Code-A-Site itself might influence this process. In applying the results of this research, one should keep in mind some of the factors peculiar to Code-A-Site which may not be representative of all innovations in Forest Service management.

Foremost, Code-A-Site is an innovation in outdoor recreation management and planning. This factor alone may affect the rate and extent of diffusion. For example, does each individual manager or even each Forest Service Region have equal responsibility for providing outdoor recreation opportunities? Relative advantage in technology transfer research usually represents economic advantage to the adopter of the innovation. In outdoor recreation management by a public agency, however, this economic advantage does not provide the basis for determining the need for the innovation. Rather, it might be the value placed upon providing a recreation opportunity (by the local manager) or it might

be the level of demand by the local public for a certain opportunity which determines the extent of the need.

Secondly, Code-A-Site may appear complex to some at first introduction. Without prior knowledge of needle sorting techniques the term itself might possibly create some inhibition to further exploration. If techniques for application of an innovation are not understood, application to the immediate problem may not be undertaken.

Another item peculiar to Code-A-Site is the geographic location of its development and introduction. It is a factor which might limit the generalizations from the Code-A-Site diffusion process to others originating from other geographical areas. The Forest Service has management responsibilities throughout the United States, is quite decentralized, and has a complex communication system. It is not clear whether information originating in the East flows to the West through the same channels or at the same rate as information going West to East.

Code-A-Site may be lacking in perceived trialability. When a manager orders Code-A-Site supplies and learns to use the system, he may find it difficult to implement the innovation incrementally. His investment may be perceived as high enough to commit him to inventory all the campsites in his unit rather than to have a trial collection from a few sites. Also, the emphasis on collection of data over time pre-empts a trial stage of a nature to adequately consider the advantages and disadvantages of the system prior to the actual decision to adopt. Therefore, the diffusion-adoption process for Code-A-Site may differ somewhat from that of a more trialable technique.

STUDY METHODOLOGY

The Adopter Population

In any study of diffusion of an innovation, a specific study population must be identified. The diffusion of the innovation is then analyzed for the entire population or for a sample of that population. In this study, although several options existed, it was decided to define the study population as all adopters of Code-A-Site in the Forest Service. The objective was to collect data on such a scale as to provide as representative a picture as possible of the diffusion process throughout the Forest Service. Since the adopter population was thought to be small enough to allow contact with every member, sampling procedures were not used.

Through contact with each Forest Service manager responsible for adoption of Code-A-Site, at whatever level of management, it could be determined how each of them learned about and decided to adopt the technology. By going beyond geographical boundaries and looking at the agency as a whole, the generalizability of study findings is enhanced. One limitation of general application which might exist is that the study population is primarily one of managers with recreation responsibility. The extent of this limitation, if it exists at all, is not clear at this time. The rate and extent of diffusion of innovations in the recreation function of the Forest Service and other management functions may be similar, in part because most of those involved in this diffusion process in recreation have such other resource management responsibilities as timber, fire control, water, mining, and range management.

Further specifications of the study population involved a definition of an adopter of Code-A-Site within the general Forest Service population. Rogers and Shoemaker (1971) define adoption as a decision to make full use of a new idea as the best course of action available. An adopter in this study is therefore the person who has made the decision to make full use of Code-A-Site. For the purpose of this study the decision to adopt is represented by actual collection of campsite information on the Code-A-Site inventory cards.

Identifying the Adopters

From initial telephone work and consultation with Forest Service researchers and managers, it was known that not all national forests, in fact, not all regions, currently included some use of Code-A-Site. It was anticipated that the adoption act itself would in most cases be on the district level. However, the decision could also be made on the forest level to apply Code-A-Site on an entire forest. It seemed doubtful that any regional office had prescribed use of this inventory tool region-wide.

Investigation into the Forest Service process for suppling Code-A-Site cards was the starting point for determining who was currently using Code-A-Site and who made the decision to use it in each area. This investigation of the Code-A-Site supply process revealed that each district desiring supplies could request them from its national forest office each year. This consolidated order for all districts in a forest would then be forwarded through channels to the regional office. Each regional office, then, had responsibility for consolidation of orders for Code-A-Site supplies from all its subordinate national

forests. These orders were then forwarded to the Region 6 office, where all regional orders were consolidated yearly and an order was placed with a commercial firm which printed the Code-A-Site cards.

Once this supply process was understood, an efficient method was devised for finding the adopters of Code-A-Site. The initial effort was to make contact with the Region 6 office to determine which regions had ordered supplies since their availability. From this initial contact it was discovered that Regions 1, 2, 3, 4, 5, 6, and 10 had all ordered supplies. Additionally, some national forests had ordered Code-A-Site supplies directly from the Region 6 office.

The second stage in locating the adopters began with telephone contact with each regional office which had ordered supplies during one or more of the years since card availability. Each of the seven regional offices were asked to compile a list of all national forests in their region which had ordered Code-A-Site supplies, what years they had ordered them, how many cards were ordered each year, and who was responsible for submitting the order from each forest. Each national forest which had received supplies was then contacted in order to determine whether the Code-A-Site process was actually in use. If so, the respondent was asked whether the Code-A-Site supplies were requested by one or several district offices or whether Code-A-Site had been adopted by someone on the national forest level.

When contact was made with national forest offices and later the district offices, special emphasis was always placed on the importance of identifying all of the adopters of Code-A-Site in the Forest Service. In two cases contacted managers helped identify an adopter not previously

discovered from information gathered through the card supply process. These individuals had received their cards through other than normal channels and had apparently initiated Code-A-Site without the knowledge of those in their respective national forest or regional offices. Information was also received in this manner which led to the discovery of two adopters of Code-A-Site which had ordered supplies through regular channels but whose units did not appear on the lists compiled by their national forest and regional offices. This fact raises some questions on the study's success in identifying every adopter in the Forest Service. It is expected that due to clerical error or inaccurate records a small number of adopters may have been missed. This number would be so small, however, that the group of adopters which were contacted is considered collectively as the adopter population, not as a sample.

Included in Appendix B is a list of all Forest Service units identified as adopting Code-A-Site. Some of those having ordered supplies had not actually utilized Code-A-Site to date and were thus not included in the adopter population. A total of 15 adopters existed at the forest level, 68 at the district level, and in two cases use of Code-A-Site was prescribed by wilderness managers or planners. These adopters represented 16 individuals from national forest supervisors' offices, nine district rangers, 42 district resource assistants, two individuals with primarily planning responsibilities, six in timber management, eight individuals in such varied positions as wilderness ranger, fire officer, recreation technician, and law enforcement, and two individuals who had left the Forest Service since the time of

adoption.

The Non-Adopter Sample

In order to adequately address some of the study hypotheses, information on a sample of 20 non-adopters of Code-A-Site was collected. The data gathered from this group of individuals provided a basis for comparison on some of the hypothesized personal and behavioral characteristics of the adopters.

The objective here was to select a sample of individuals in positions with similar opportunities as the adopters to have implemented Code-A-Site. For this reason, the sample of non-adopters was stratified in position in approximately the same proportion as existed in the adopter population. The sample of 20 was divided into three position categories: district resource assistant, district ranger, and national forest recreation staff officer. According to the proportion evident in the adopter population, 50 percent of the non-adopters selected were resource assistants, 25 percent were district rangers, and 25 percent selected were recreation staff officers. These positions were then randomly selected from Forest Service regions, national forests, and districts. A list of the Forest Service units and positions which were contacted for study non-adopters is included in Appendix C.

Measurement Methods

Measurement methods in diffusion research have varied somewhat according to the social system of interest. For example, in studies of some primitive and less advanced cultures, observational techniques in conjunction with personal interviews proved effective (Rogers, 1962;

Lin and Burt, 1975). In at least one case a combination of personal interviews and mailback questionnaires was used (Loy, 1969). In a more recent case, modern society's greater flexibility in usage of communication systems was illustrated through the use of telephone interviews (Haug, 1976).

Due to the large geographical scope of this study, the extreme mobility of the adopter population, and the time constraints involved, a telephone interview was selected as the best method of data collection. The interview also appeared useful in clarification of study questions, stimulating response to open-ended questions, and arousing participant interest in the study.

The Adopter Interview

In most cases, a specific individual was identified at the adopting unit from information received at a higher organizational level. When initial contact was made with the probable adopter, confirmation was sought on who actually made the adoption decision regarding Code-A-Site for that unit. This information would either prompt continuation of the interview or lead to a search for the actual adopter. When the adopter was located, this individual was introduced to the general research objectives and asked to cooperate in a telephone interview. The adopter was allowed to complete the interview at that time or to schedule it at a more convenient time.

The information collected in this telephone interview for determining the diffusion process and the differences between adopters and non-adopters was extensive. It included time of awareness of the innovation, time of adoption, information sources, communication channels

used, number of years with the Forest Service, number of years in position, number of years in the recreation function, attendance at professional meetings, membership in professional organizations, subscriptions to professional journals, age, and education. The adopter telephone interview schedule is contained in Appendix D.

The Non-Adopter Interview

As previously mentioned, this non-adopter sample represented resource assistants, district rangers, and recreation staff officers randomly chosen from national forests and districts. No specific person was asked for when contact was made with the unit; only the person in the desired position was requested. The information gathered in the non-adopter interview was essentially the same as that of the adopter interview except for an additional question probing for a reason why Code-A-Site had not been adopted in that individual's unit. The objective of the additional question was to discover agency or unit restrictions or perceived restrictions which might have limited the manager's opportunity to exhibit innovative behavior. The non-adopter interview schedule is included in Appendix E.

While the interview substance was essentially the same for adopters and non-adopters, the explanation of the purpose of the research differed slightly. While the adopters were keyed to the diffusion of Code-A-Site as the principal process being studied, the non-adopters were keyed more to the technology transfer process of the Forest Service as a whole. The primary reason for this difference in format was to avoid a situation in which a non-adopter might feel embarrassed or threatened for not having adopted Code-A-Site. In the non-adopter

interview, Code-A-Site was mentioned only in an effort to confirm that none of these individuals were adopters who had been overlooked in some way. Also insight was desired into how Code-A-Site had diffused to those knowledgeable non-adopters.

Data Analysis

Since the group of adopters essentially made up an entire population, parameters were known for many variables of interest. In those cases the presentation of data consists of frequency analysis and in some cases rankings according to frequency or time order. Some variables of interest involved comparison of certain attributes of the non-adopter sample with the same attributes of the adopter population. In such cases the parameters for these attributes were known for the adopter population, and statistics existed for the non-adopter sample which estimate the parameters of a non-adopter population. Statistical analysis in this situation consisted of formulation of hypotheses that the non-adopter population parameter for each appropriate variable was equal to that numerical value which was found to be the parameter for that variable in the adopter population. The student's t-test was used to test these hypotheses.

Additionally, some percentage comparisons are included in which the percentage factors found in both the adopter population and the non-adopter sample were considered a mean probability factor; these were then compared through use of a student's t-test. In some cases contingency table analysis of bivariate correlation was performed for hypothesized relationships among variables measured in the adopter population.

STUDY FINDINGS

Response to Interviews

Some problems were anticipated in scheduling interviews because of vacationing personnel, individuals who were working away from the office for extended periods of time, and persons who had transferred within the Forest Service or had left Forest Service employment. However, every reasonable effort was made to complete the interview with the appropriate individual. Only one refusal to cooperate was encountered out of 86 individuals contacted in the adopter population. Of the 20 non-adopters, not one refused to participate. Of those participating in the study, all except one non-adopter expressed interest in receiving a summary of the results of the study. Many adopters expressed concern over the technology transfer process in the agency and offered additional assistance if needed in order to improve this process.

A total of just over 400 telephone calls were made to Forest Service offices across the country in order to make contact with and interview 85 adopters and 20 non-adopters. Of the calls made, one travelled the last 15 miles by air with such poor reception that the accuracy of the information collected is somewhat doubtful (St. Helens District of the Gifford Pinchot National Forest). Another telephone connection which baffled the study investigator and local operators alike was with an agency phone (Salmon River District of the Klamath National Forest) having a nine-digit number instead of the normal ten digits. This unusual exchange system, however, is itself an example of technology transfer, for only recently did this community give up its crank telephones.

Study Hypotheses

Communication Channels Stimulating Initial Awareness

Hypothesis: Initial awareness of Code-A-Site for the adopting individual was more often stimulated by mass media than by other communication channels.

Finding: Local media channels stimulated initial awareness of Code-A-Site for most adopters; mass media was the channel used in only a few cases.

The local media effect found here can be defined as the importance of communication channels which exist within a Forest Service region or national forest. Whereas mass media channels are considered here to be those non-directed channels with blanket coverage available to the entire agency, local media channels operate within a region or forest. Local channels pass information from regional or national forest offices to lower levels in the organization. This information is not sent by an individual to a particular person, but rather from an office to all individuals who are employed in a certain position within that region or forest.

This information passing through the local media channels appears in this case to be very effective in stimulating initial awareness among future adopters. Of 84 individuals who could isolate this awareness source, 58 (69 percent) cited local media sources (Table 3). Informational sources cited as travelling most frequently through local media channels were circulated memos, training sessions, meetings, Code-A-Site supplies, and copies of PNW-209 and PNW-280.

Only five (6 percent) cited such true mass media sources as the

Table 3. Channels of initial awareness for adopters.

Communication Channels	Specific Sources	Absolute Frequency	Relative Frequency (%)
Mass Media	PNW publication list	2	40.0
	Wesfornet	2	40.0
	Management plan	1	20.0
	Total:	5 (6%)*	
Local Media	PNW-209 and PNW-280 through local channels	17	29.3
	Circulated memo	13	22.4
	Training within region	15	25.9
	Meetings within region	8	13.8
	Supplies	5	8.6
	Total:	58 (69%)*	
Interpersonal	Person	15	71.4
	PNW field test	6	28.6
	Total:	21 (25%)*	

*Of total adopter population.

Wesfornet combined listing of experiment station publications or the Pacific Northwest Forest and Range Experiment Station's listings of its publications as the source of initial awareness.

There were 21 (25 percent) individuals who said that their initial awareness of Code-A-Site came from interpersonal contact. Of these, four said that the information was from a supervisor, one said it was from a person whom he supervised, four cited peers in other units (individuals of a similar position and status to their own), six pointed to contact with research personnel, and six noted involvement with initial field testing of Code-A-Site by PNW researchers as their primary awareness source (Table 4). These six individuals adopted Code-A-Site at a later time on areas other than those used in the field test.

One further item of interest here concerning initial awareness was whether the individual sought out the awareness source or whether the information merely flowed to him or her without the individual having done anything to promote it. Sixty-nine individuals, or 81.2 percent, said that they did not actively seek the information source--that if it was a meeting or training session they were sent to it or invited without actively seeking to go. If it was written material, then it was channeled to them. Often they did not know who sent the material; they simply knew it came through channels from the organizational level immediately superior to theirs. Only 11 individuals, or 12.9 percent, claimed that they had actively sought the source, while the remaining five managers were unable to recall the circumstances surrounding contact with the source (Table 5).

Table 4. Interpersonal awareness source.

Source	Absolute Frequency	Relative Frequency (%)
Supervisor	4	19.0
Supervisee	1	4.8
Researcher	12*	57.1
Peer	4	19.0
Total	21	100.0

*Six of these adopters cooperated with researchers during initial field testing of Code-A-Site.

Table 5. Number of adopters actively seeking awareness source.

Actively Seeking Source	Absolute Frequency	Relative Frequency (%)
Yes	11	12.9
No	69	81.2
Could Not Recall	5	5.9
Total	85	100.0

Communication Channels Used to Gather Additional Information

Hypothesis: After initial awareness, the potential adopters placed equal reliance upon mass media and interpersonal communication channels to seek more information about the innovation.

Finding: There was about equal reliance on interpersonal and local media information sources for additional information on Code-A-Site. Only a small number of adopters received additional information through mass media channels.

Of the 85 adopters, 20 individuals stated that they did not consult any other source beyond the awareness source (Table 6). The importance of the local media channels is illustrated here by the fact that 17 of the 20 who adopted without further information had received their initial awareness from local media sources. These 17 individuals represented almost 30 percent of the 58 adopters citing local media sources of initial awareness. Only 14.28% (three individuals) of those citing interpersonal awareness sources adopted without seeking additional information.

As illustrated in Table 7, the interpersonal and local media channels each provided about 40 percent of the primary sources of further information on Code-A-Site to adopting individuals. While the reliance on local media channels was reduced somewhat from the awareness stage, personal contacts increased. Of the 26 personal contacts made, 16 were with researchers, four received information from supervisors, two received more information from their own employees, and four obtained further information from peers from other U.S. Forest Service units

Table 6. Initial awareness source of individuals not consulting additional information source prior to adoption.

Communication Channels	Specific Sources	Absolute Frequency	Relative Frequency (%)
Local Media	Forest Service publications or supplies through channels	7	47.0
	Circulated memo	3	17.6
	Meeting	1	5.9
	Training	5	29.4
	Total:	17	
Interpersonal	Person	3	100.0
	Total:	3	

Table 7. Primary communication channels used to gather additional information.

Communication Channels	Specific Sources	Absolute Frequency	Relative Frequency (%)
Mass Media	Forest Service publications or supplies ordered from PNW	11	91.7
	Wesfornet abstract	1	8.3
	Total:	12 (18.5%)*	
Local Media	Forest Service publications or supplies through channels	11	42.3
	Circulated memo	2	7.7
	Meetings	2	7.7
	Training	9	34.6
	Field trip	1	3.8
	Slide-tape	1	3.8
	Total:	26 (40%)*	
Interpersonal	Person	21	77.8
	Introduced by PNW	4	14.8
	Previous use	2	7.4
	Total:	27 (41.5%)*	

*Of total adopters gathering additional information.

(Table 8).

Mass media channels were found to not be a heavily used source of information in this phase of the adoption process. Only 12 individuals, 18.5 percent of the adopter population, received additional information through this channel.

Of those adopters who did consider additional information beyond the awareness source (65 individuals), 25 actively sought out these additional sources (Table 9). Those seeking information tended to seek out local media types of sources such as requesting supplies and publications from their supervisor office or requesting to attend training sessions or field trips sponsored by the region or forest. Seven, however, sought out persons with knowledge of Code-A-Site for more information. An additional 31 individuals unintentionally came into contact with additional information which helped them make a decision regarding the adoption of Code-A-Site. Nine individuals could not remember how they had come in contact with the additional information source.

The last area of interest concerning sources of information used in the adoption process is the number of individuals who consulted more than one additional source after awareness. Twenty-one adopters from the study population did consult more than one additional source (Table 10). Only three (14.29 percent) obtained access to these sources through mass media channels, ten (47.62 percent) used local media channels, and eight (38.09 percent) used interpersonal channels. The interpersonal contacts were with four researchers and four peers. Of the 21 individuals seeking more than one additional source, eight actively sought the source and eight did not. Five could not recall the circumstances

Table 8. Interpersonal sources of additional information.

Source	Absolute Frequency	Relative Frequency (%)
Supervisor	4	15.4
Supervisee	2	7.7
Researcher	16*	61.5
Peer	4	15.4
Total	26	100.0

*Four of these adopters cooperated with researchers during initial field testing of Code-A-Site.

Table 9. Number of adopters actively seeking the additional information source.

Actively Seeking Source	Absolute Frequency	Relative Frequency (%)	Adjusted* Frequency (%)
Yes	25	29.4	38.5
No	31	36.5	47.7
Could Not Recall	9	10.6	13.8
Consulted No Other Sources	20	23.5	--

*Without inclusion of those consulting no other sources.

Table 10. Communication channels used when gathering additional information from more than one source.

Communication Channels	Specific Sources	Absolute Frequency	Relative Frequency (%)
Mass Media	Forest Service publications or supplies ordered from PNW	3	100.0
		Total: 3 (14.29%)*	
Local Media	Forest Service publications or supplies from channels	4	40.0
	Meetings	2	20.0
	Training	4	40.0
		Total: 10 (47.62%)*	
Interpersonal	Person	8	100.0
		Total: 8 (38.09%)*	

*Of total adopters gathering additional information from more than one source.

surrounding the information exchange (Table 11).

Age and Experience and the Adoption Decision

Hypothesis: The potential adopter's age, years with the Forest Service, and time in position had no relationship with the decision to adopt or not adopt the innovation.

Finding: While the mean age and number of years with the Forest Service were slightly lower for the non-adopters, statistical analysis failed to provide any evidence of significant differences. The mean time in position was nearly identical for the adopters and non-adopters.

The mean and standard deviation of the age, years with the Forest Service, and time in position variables for the adopter population were known parameters. To test the third hypothesis, the non-adopter sample statistics for these variables were compared to the corresponding adopter population parameters. Student's t-tests were performed using the sample means and sample standard deviation from the non-adopter sample ($n = 20$) to calculate the test statistic. The null hypothesis was that the mean of the non-adopter population was not significantly different from the numeric value found to be the mean of the adopter population.

The tests showed no significant differences between the age, years with the Forest Service, and time in position of the adopters and the non-adopters. These personal characteristics of the adopters offered little in explanation of adopting behavior (Tables 12 and 13).

Additionally, a test was performed to determine whether adopters and non-adopters differed in the number of years spent in the recreation function. In this case the mean number of years spent working in

Table 11. Number of adopters actively seeking more than one additional information source.

Actively Seeking Source	Absolute Frequency	Relative Frequency (%)	Adjusted* Frequency (%)
Yes	8	9.4	38.1
No	8	9.4	38.1
Could Not Recall	5	5.9	23.8
Did Not Consult a Secondary Source	64	75.3	--

*Without inclusion of those who did not consult a secondary source.

Table 12. Comparison of age for adopters and non-adopters.

	Adopter	Non-Adopter
Range in Age	27-56	25-49
Mean Age	40.47	38.10*
Standard Deviation	6.83	6.66

*Not significantly different from the adopter population parameter. Student's t-test ($\alpha = .05$).

Table 13. Comparison of work experience variables for adopters and non-adopters.

Measured Variable		Adopter	Non-Adopter
Years with the Forest Service	Range	1.5-36	2.0-26
	Mean	16.13	13.6*
	Median	16.12	13.50
	Standard Deviation	7.87	7.5
Years in Position	Range	.5-22	.5-13.0
	Mean	4.34	4.45*
	Median	3.10	3.00
	Standard Deviation	.17	3.64
Years in the Recreation Function	Range	1.5-31.0	1.5-23.0
	Mean	11.40	8.85*
	Median	10.21	3.75
	Standard Deviation	6.37	7.59

*Not significantly different from the adopter population parameter. Student's t-test ($\alpha = .05$).

recreation for the Forest Service by the non-adopters (8.85 years) was considerably lower than for the adopter population (11.44 years), but this difference was not statistically significant.

Opportunity for Information Exchange and the Decision to Adopt Innovations

Hypothesis: Accessibility to communication channels and the degree of cosmopolitanness of the potential adopter have significant, positive relationships within decisions to adopt innovations.

Finding: Generally, there is no difference in the cosmopolitan nature of adopters and non-adopters. However, for those having attended conferences, training sessions and professional meetings during the last year, adopters and non-adopters differed significantly in the number of such events attended outside their immediate region.

The general interest here was in finding out if adopters and non-adopters differed significantly in opportunities for information gathering or exchange outside their immediate offices. Questions about access to experiment station publications, opportunities to attend professional conferences sponsored by professional groups, training sessions, and professional meetings, were included in the interview for this reason.

Access to Forest Service Experiment Station Publications. Virtually every member of the adopter population (84 of 85, or 98.8 percent) and of the non-adopter sample (19 of 20, or 95 percent) indicated they personally had access to Forest Service Experiment Station publications. In the adopter population, 64 individuals (76.2 percent) considered the

Wesfornet compiled listings to be the primary channel of access. Other primary sources listed were specific experiment stations (nine individuals or 10.7 percent) and unidentified listings from within the local region (12 individuals or 14.3 percent). When asked how they normally came into contact with these information sources, 78.6 percent of the adopters (66 individuals) responded that copies were circulated at the office. Ten individuals (8.4 percent) responded that they actually received their own copy through channels at the office, and only five individuals (5.9 percent) received these information sources at home.

Of the 19 non-adopters having access to Experiment Station publications, 13 (68.4 percent) cited the Wesfornet compiled listing as their channel of access. Unidentified listings channeled to the non-adopter were cited as the primary access sources in another five cases (26.3 percent). The other individual personally received publications from one Experiment Station through Forest Service channels.

When these 18 individuals (not including the one person receiving publications directly from an Experiment Station) were questioned concerning how they received these listings of publications, it was found that for 14 managers (73.9 percent), the listings were circulated through their offices and they saw them for a limited time. Four (21.9 percent) said that their listings were sent directly to them for their use.

Conferences, Training and Meetings. The adopters and non-adopters responded in a similar manner when asked if they had attended training sessions, professional meetings, and conferences sponsored by professional groups during the last year (Table 14).

Table 14. Attendance at conferences, training sessions, and professional meetings by adopters vs. non-adopters.

Opportunities for Information Exchange	Adopter				Non-Adopter			
	Yes	%	No	%	Yes	%	No	%
Conferences	43	50.6	42	49.4	9	45*	11	55
Training	77	90.6	8	9.4	18	90.0*	2	10
Professional Meetings	75	88.23	10	11.77	15	75*	5	25

*Chi-square tests of hypotheses concerning specified cell probabilities indicated these percentages did not differ significantly from those of the adopter population ($\alpha = .05$).

Further comparison of response for the adopters and non-adopters who had attended conferences, training sessions or meetings in the last year failed to show any differences in the number of such events attended (Table 15).

However, when the number of conferences, training sessions, and meetings attended outside the adopters' and non-adopters' Forest Service region were compared, a significant difference was noted (Table 16). Adopters had a greater frequency of participation in these events outside of the immediate region. This provides some evidence of a more cosmopolitan nature of the adopter population.

Personal and Situational Characteristics and Time of Adoption

Hypothesis: Adopters who differed in time of adoption varied in their personal and situational characteristics.

Finding: Years with the Forest Service, years in the recreation function, and the adopter's age were found to be inversely related to the time of adoption.

Two methods were used to analyze and illustrate the data for this hypothesis. First of all, for each personal or situational variable a mean was calculated for all adopters who adopted within each year since the development of Code-A-Site. Graphic representations of the relationship between these calculated means for each variable and the time of adoption were then developed. Secondly, Pearson correlation coefficients were calculated relating the strength of the relationship between the time of adoption and the personal or situational characteristics of the adopters. In these correlations, the characteristics of each adopter were related to time of adoption, rather than relating the mean of

Table 15. Numbers of conferences, training sessions, and meetings attended by adopters vs. non-adopters.

Opportunities for Information Exchange	Adopter			Non-Adopter		
	Range	Mean	Median	Range	Mean	Median
Number of Conferences	1-6	1.91	1.43	1-3	1.89*	1.88
Number of Training Sessions	1-9	3.43	3.06	1-8	3.56*	3.25
Number of Professional Meetings	1-65	11.05	5.88	1-20	8.80*	5.33

*These statistics do not differ significantly (t-test, $\alpha = .05$) from those corresponding values for the adopter population.

Table 16. Numbers of conferences, training sessions, and meetings attended outside the region by adopter vs. non-adopter.

Opportunities for Information Exchange	Adopter			Non-Adopter		
	Range	Mean	Median	Range	Mean	Median
Number of Conferences Out of the Region	0-2	.395	.241	0	0	0
Number of Training Sessions Out of the Region	0-4	.351	.188	0-1	.111*	.063
Number of Professional Meetings Out of the Region	0-15	.714	.111	0-1	.267*	.182

*Significantly different from the corresponding adopter population parameter (t-test, $\alpha = .05$).

the characteristics of all adopters in a given year to time of adoption.

Those adopters with greater time in the Forest Service tended to adopt at an earlier date (Table 17). Similarly, those with greater time working in the recreation function of the Forest Service and of greater age also tended to adopt earlier (Tables 18 and 19). These findings appear to indicate that the more experienced an adopter is in both general Forest Service policy and practices and in recreation management, the more confident he is in adopting innovations.

Contrasted to the above finding is the fact that the length of time spent in the adopting position is not related to how soon the innovation was adopted (Table 20). This fact could be due to the similarity of management responsibilities between the adopter's current position and those of his recent past. Whatever the reason, longer time in position did not correlate with time of adoption.

One additional personal characteristic which tended to correlate somewhat with the time of adoption was the number of conferences the adopters had attended during the last year outside their working region (Table 21). The correlation (-.2300), while not an extremely strong one, could serve to suggest that the more contact potential adopters have outside their immediate region, the more likely they are to adopt an innovation.

Other variables such as number of conferences attended, meetings and training sessions attended inside and outside the region, extent of membership in professional organizations or societies, and number of professional magazines and journals received do not appear to correlate with the time of adoption (Table 22).

Table 17. Correlation between years in the Forest Service and time of adoption.

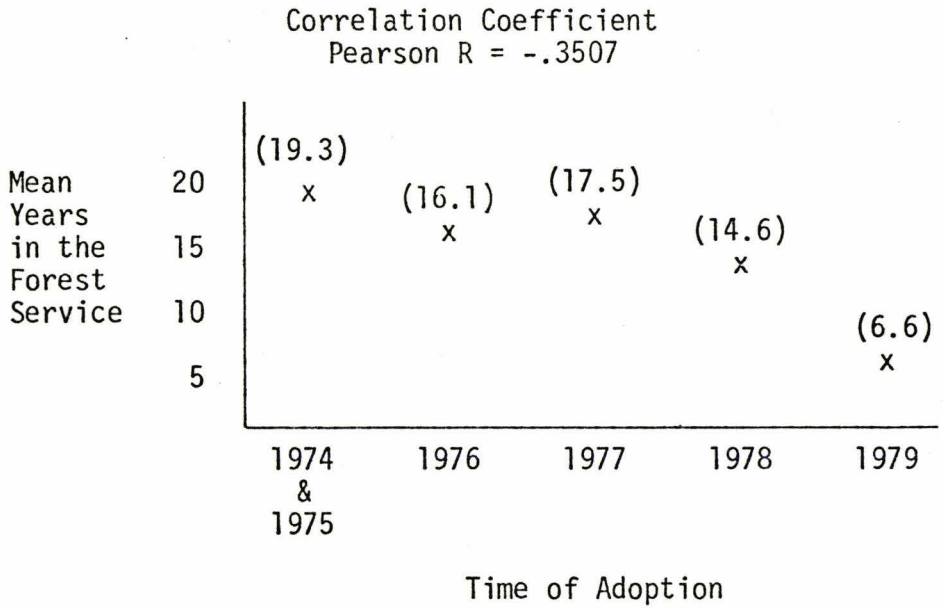


Table 18. Correlation between years in the recreation function and time of adoption.

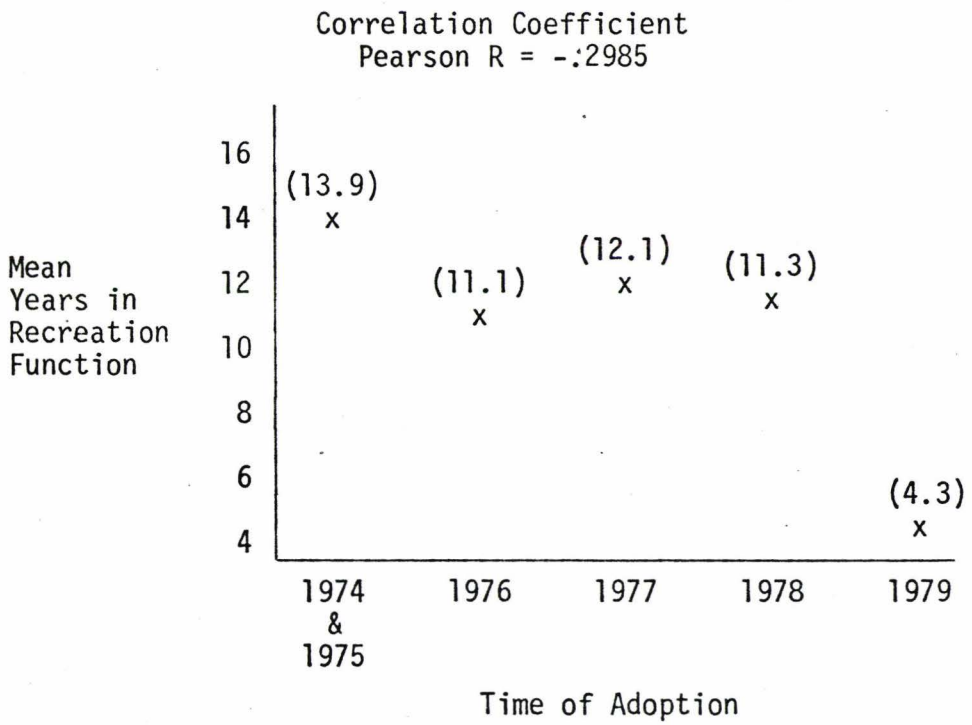


Table 19. Correlation between age of adopter and time of adoption.

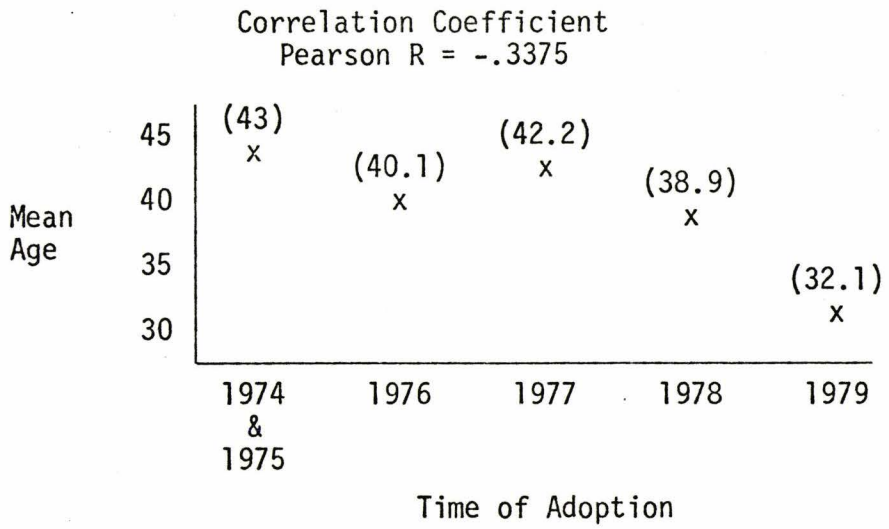


Table 20. Correlation between years in position and time of adoption.

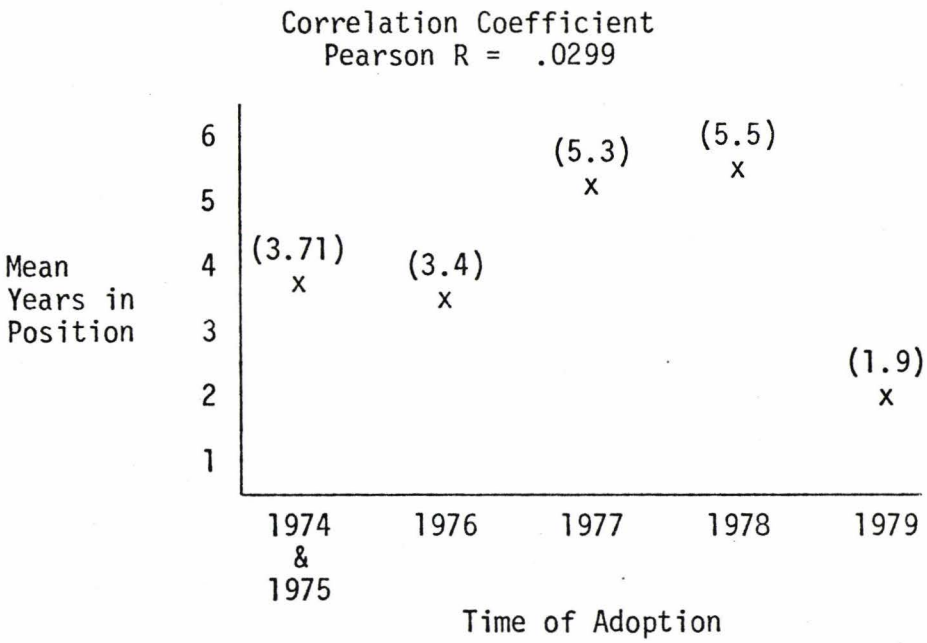


Table 21. Correlation of number of conferences out of region with time of adoption.

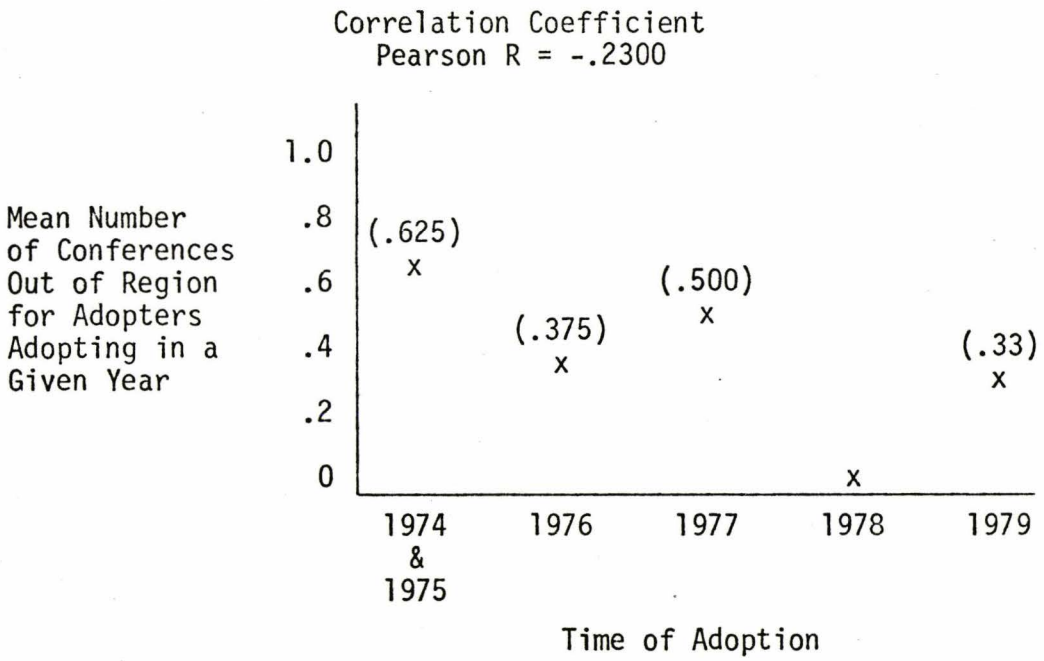


Table 22. Pearson R correlation coefficient for situational characteristics with time of adoption.

	Conferences		Training Sessions		Professional Meetings			
	Total Number	Total Out of Region	Total Number	Total Out of Region	Total Number	Total Out of Region	Membership in Organizations	Number of Professional Journals Received
Time of Adoption	-.1078	-.2300	.2006	.0157	.1638	-.0831	.0243	-.1993

Communication Channel Used by Forest Service Region

Hypothesis: Types of communication channels determined to be important in the initial awareness and information-gathering phases of the decision process vary by Forest Service region.

Finding: With only one exception, all regions relied heavily on local media sources for initial awareness of Code-A-Site. When additional information was gathered, the interpersonal sources took an increased importance and almost all of the use of mass media disappeared.

Awareness Sources. Most of the adopters (80 percent) of Code-A-Site were found in Forest Service Regions 1 and 6 (Figure 4). In both of these regions, local media services were used far more than other types of sources (Table 23). This reliance on local media sources totaled 81.1 percent (30 individuals) in Region 1 and 61.3 percent (19 individuals) in Region 6. In both of these regions, the reliance on local media sources for awareness included use of Forest Service publications and Code-A-Site supplied channeled to managers by regional and forest personnel, circulated memos originating inside the region or forest, and regional of forest meetings or training sessions. Region 5, which includes another 11.76 percent of the adopter population, placed equal reliance on interpersonal channels and local media channels for awareness, Region 3 depended entirely on local media, and the two Region 2 managers both became aware through interpersonal channels.

Additional Information Sources. The expected switch to a greater reliance on interpersonal channels during this phase was exhibited in Regions 1 and 6, although some reliance still existed on local media

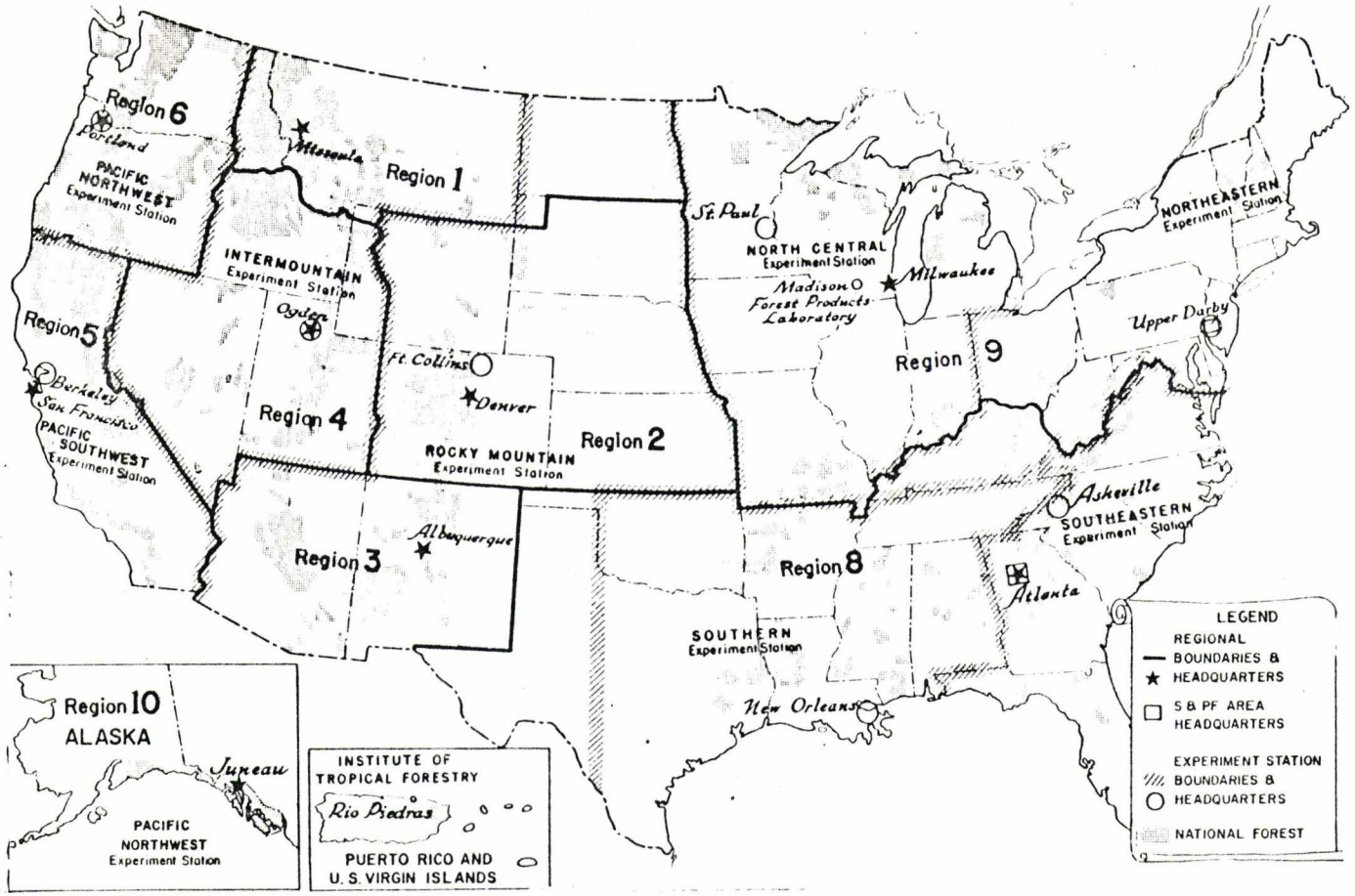


Figure 4. Geographic boundaries of Forest Service regions.

Table 23. Awareness source by region.

Region	Mass Media	Local Media	Interpersonal
1	3 (8.1%)	30 (81.1%)	4 (10.8%)
2	0	0	2 (100%)
3	0	4 (100%)	0
5	2 (30%)	4 (40%)	4 (40%)
6	0	19 (61.3%)	12 (38.7%)

sources (Table 24). Regions 3 and 5 still maintained their dominant use of local media sources in this phase. Interestingly, both adopters in Region 2, having become aware through interpersonal channels, came into contact with no additional information before deciding to adopt Code-A-Site.

Length of Adoption Period by Forest Service Region

Hypothesis: The length of time from development to application in the field varied by Forest Service region.

Finding: Evidence exists that there was a geographical influence on the rate of spread of Code-A-Site.

One of the interview questions sought information on when Code-A-Site was first implemented as a result of the adopter's decision to adopt. This information was somewhat difficult to obtain with precision due to the length of time that had sometimes elapsed since the adoption decision. There was even some difficulty in pinpointing exactly when the action took place in more recent cases. For these reasons, the adopters were asked to specify only the season and year that Code-A-Site data were first collected. All time calculations are therefore figured on the basis of number of seasons.

The season and year specified as the first possible application date was the summer of 1974. Using this season as a starting point in the adoption sequence, the relative length of time from development to adoption could be calculated for each adopter. These periods of time could then be examined cumulatively to determine how regions differ in the mean length of this development-to-application period (Table 25).

The data illustrate the relationship between the spread of Code-

Table 24. Additional information sources by region.

Region	Mass Media	Local Media	Interpersonal
1	0	14 (56%)	11 (44%)
2	0	0	0
3	0	3 (100%)	0
5	0	7 (77.77%)	2 (22.23%)
6	1 (3.70%)	13 (48.15%)	13 (48.15%)

Table 25. Length of development-to-adoption period by region.

Region	N	Mean Number of Seasons	Range of Number of Seasons	Range of Adoption Dates
6	31	8.32	0-16	Summer 74 - Summer 78
1	37	11.68	3-20	Spring 75 - Summer 79
5	10	13.20	4-20	Summer 75 - Summer 79
3	4	15.00	12-20	Summer 77 - Summer 79
2	2	18.00	16-20	Summer 78 - Summer 79

A-Site and its origin in Region 6. The development-to-application period was shortest in Region 6 (a mean of 8.32 seasons for 31 adopters), followed by Region 1 where Code-A-Site has spread extensively (a mean of 11.68 seasons for 37 adopters). Region 5, also in proximity to Region 6, had the third ranking number of adopters (10) and also ranked third in the mean length of this development-to-application period (13.2 seasons). Mean application spread for Region 3 and Region 2 were 15.0 and 18.2 seasons, respectively. The farther a region was from the origin of the innovation, the less extensive was the spread and the greater was the length of time from development to application.

Another comparison which is relevant at this point is between the length of awareness-to-adoption periods of the various regions (Table 26). When the difference was calculated between the season each adopter became aware of Code-A-Site and the season in which it was first applied, a relative index was obtained of the mean length of the adoption period for each region. Table 26 illustrates the relatively short adoption periods exhibited in Regions 5 and 1, followed by Regions 3 and 6, respectively. The close proximity to Region 6 may account for the short awareness-to-adoption period in Regions 1 and 5.

Upon examination of Tables 25 and 26, one point of interest is the difference in the ranking of Region 6 in the two tables. In Region 6, where Code-A-Site was developed and first introduced, the mean length of time measured from the development of Code-A-Site to the adoption was relatively short compared to the other regions. Managers of Region 6 learned of its existence earlier than in other regions and began adopting it sooner there. However, as illustrated in Table 26, the actual

Table 26. Length of awareness-to-adoption period by region.

Region	N	Mean Number of Seasons	Range of Number of Seasons
5	10	3.10	1-8
1	37	3.46	0-10
3	4	5.00	3-8
6	31	5.42	1-16
2	2	5.50	4-7

mean time from awareness to adoption for Region 6 was relatively long. This fact could be due to Code-A-Site's general lack of field testing and acceptance when potential adopters in Region 6 learned of it, whereas by the time the other regions learned of this inventory tool the advantages of its use in Region 6 may have been well known.

Adoption in Alaska

The data collected from the one adopter of Code-A-Site located in Region 10 were included in all frequencies and computations for the adopter population. In hypotheses six and seven, which included comparisons of regions, this region was omitted due to only containing the one adopter. The primary information of interest on this adopter which was not included elsewhere in this report is what information channels were used by this person and the length of the adoption period.

The adopter from Region 10 became aware of Code-A-Site through attendance at a Forest Service Recreation Workshop in the Fall of 1977. This individual actively sought authorization to attend this workshop which was held outside his own region, in Region 6. Additional information on Code-A-Site was gathered through direct contact with a researcher at the Pacific Northwest Forest and Range Experiment Station in which written material was requested on this inventory process. Code-A-Site was first applied in the Spring of 1978.

The relative length of time from development to application for this individual was 15 seasons (adoption date: Spring, 1978). When compared to the mean number of seasons required by the other regions (Table 24), this period length seems to rank with the other two regions (3 and 2) slightly removed from Region 6, the development point. When

the length of the adopter period was examined, however, an extremely short one was noted. The adoption period length of two seasons ranks (Table 25) well in advance of the period length of any of the other regions.

Spread of Code-A-Site to Region 9

Data were not collected in the Eastern Region of the Forest Service due to the lack of actual adoption of Code-A-Site by managers within the region. Contact was made, however, with two individuals currently involved in introducing Code-A-Site to this region. One of these managers, who is now located in the Region 9 office, was an adopter for a Forest Service district in Region 5. This move to Region 9 was made in May, 1979. This individual cooperated with PNW researchers in initial field testing of Code-A-Site in Region 6 prior to moving to Region 5 in 1975. This individual also requested that a second Forest Service employee, who was working in Region 6 and who had extensive experience with Code-A-Site, visit the Region 9 office and present Code-A-Site and its application to interested national forest recreation staff officers. This was done in October, 1979.

As a result of this introduction of Code-A-Site to Region 9 through the combined effort of these two individuals experienced in its use, many managers in the Eastern Region have expressed interest in its advantages for recreation management. Adaptations are currently being outlined for the original Code-A-Site inventory card to enable application to the different type of terrain found in the East.

CONCLUSIONS

Summary of Findings

Information Sources

Initial awareness was most often stimulated through use of local media channels. In 69 percent of the cases adopters reported first learning about Code-A-Site through communication channels originating within their own region. Highest cited among those sources used were Forest Service publications on Code-A-Site and Code-A-Site supplies which had been distributed within a region by regional recreational personnel. Training sessions within the region and circulated memos were second and third most important, respectively, as Code-A-Site awareness sources. Of the 85 adopters, no matter what type of channel was used in creating the awareness, 81.2 percent (69 individuals) stated that this awareness source was not actively sought. Most contact with the local media sources stimulating initial awareness of Code-A-Site was not due to special effort by the adopters.

After initial awareness many of the adopters again turned to the local media channels for more information during their decision-making process. However, during this stage there was a much greater reliance on interpersonal channels as a means to evaluate the perceived advantage of Code-A-Site than during the awareness stage.

The local media effect found here is an important one. It illustrates the commitment felt by unit managers when interest in a particular innovation is demonstrated by their superior office. Although the unit manager often does not even know who specifically channelled the information to him or her, the perceived interest on the regional

level, or the perceived "local" commitment in making the potential adopter aware of the innovation, served to speed the adoption process.

True mass media sources such as the Wesfornet combined listing of Forest Service publications and individual Experiment Station publication listings were used very little in any stage of the adoption process. Only 6 percent of the adopter population became aware of Code-A-Site through contact with one of these sources, although 18.5 percent of those gathering additional information used these sources. This increase in reliance on mass media channels from the awareness stage to the stage where additional information is gathered indicates some reliance by managers on Forest Service mass media sources. The mass media channel is generally available to all managers and thus is a good source of information on an innovation with limited publication.

Personal and Situational Characteristics of the Adopter

The age, number of years with the Forest Service, number of years in current position, and number of years in the recreation function of the Forest Service of the adopters did not differ significantly from those of the non-adopters. These variables were not useful in helping explain who adopted and who did not adopt the innovation. These characteristics, however, may help explain who adopted earlier and who adopted later. Specifically, the age, years with the Forest Service, and the number of years in the recreation function were inversely related to the time of adoption, i.e., the more years they worked in the Forest Service, the earlier they were likely to adopt an innovation. The number of years an adopter had worked in his position when he decided to implement Code-A-Site appeared to have no influence on the time

of adoption.

The reasons for these findings concerning the relationships between age, years with the Forest Service, years in the recreation function, and years in position and the time of adoption were not clear. It is felt, however, from examining the data and from conversations held with the adopters during the interview process, that the manager with more experience in recreation management with the Forest Service, more years in the Forest Service in whatever capacity, and of an age reflective of this extensive experience was simply quicker to recognize the need for such an inventory system as Code-A-Site. The longer a manager has worked in dispersed recreation management in the Forest Service, the more aware he was of the need for continuity of information on campsites as managers come and go. This person appeared also to be more aware of the needs for impact assessment due to visitor use and natural forces than the less experienced manager in the field.

Besides the above factors which might affect adopter behavior, the fact exists that the longer an individual has been a part of the system, the more knowledgeable that person is of how much risk he or she can take and maintain job security. Also, with increased experience in the field, less perceived risk may be involved in adopting an innovation. A relatively new employee may perceive the risk as much greater than it actually is.

Opportunities for Information Exchange

Adopters and non-adopters of Code-A-Site did not differ in overall attendance of conferences, training sessions, and professional meetings. Of those attending these kinds of events, however, there was a

significant difference between adopters and non-adopters in the number which occurred outside the individual's immediate region. Adopters of Code-A-Site indicated more opportunity for information exchange with people outside their immediate region.

This opportunity for information exchange outside the Forest Service employee's region reflects the cosmopolite nature of the adopters. Through participation in conferences, training sessions, and meetings outside their regions, these individuals become vital communication links within the Forest Service. These people are important in both spreading ideas laterally through the Forest Service from region to region and for initiating a vertical flow of information within their own regions or national forests.

Regional Comparisons

While the regions differed somewhat in their use of information sources both for initial awareness and for gathering additional information, no specific trends existed in these differences. In all regions except Region 2, the local media effect was evident in the awareness stage. The two Region 2 adopters learned of Code-A-Site from interpersonal sources. The trend towards greater dependence on interpersonal communication during the gathering of additional information, which was noted in the general adopter population, was strongly demonstrated in Regions 1 and 6. The other regions did not experience this change in reliance on channels; in fact, Region 5 went to greater use of local media channels during the gathering of additional information on Code-A-Site.

The length of adoption period did vary between regions with an

observable geographic effect. Those regions near Region 6, where Code-A-Site was developed and first introduced through field testing, adopted earlier and had a shorter time from awareness to adoption than those outlying regions in which Code-A-Site had not spread extensively. Region 6 was unique in that although the adoption date was earliest for this region, the mean length of time from awareness to adoption was relatively long. It is suspected that this phenomenon exists due to the newness of the innovation when it became known in Region 6.

Management Implications

The dependence on local media communication channels by adopters illustrates the need for expanded coordination on the regional and national forest levels of information dissemination. In each region and national forest office throughout the Forest Service, existing personnel or new personnel could be assigned the specific task of coordinating information dissemination. As research results in the form of publications, reports to the Forest Service on contract, or offers from researchers to present findings enter this individual's office, an effort could be made to evaluate the extent of the applicability of this information to that region or forest. This information could then be directed to the level of the organization where such information could be most useful along with the evaluation made by the information coordinator. The unique aspect of this position would be that this individual's primary function in the Forest Service would be to seek out new management and planning practices and provide the local managers with enough information to allow them to make decisions regarding the applicability of the innovation to their own situation.

In cases where such an information officer or training officer might already exist, emphasis must be on making these individuals aware of the importance of this local media effect in transferring technology within the Forest Service. In cases where no such position currently exists, in the interim all members of the regional staffs and those in the supervisor's office on each national forest must be made aware of the impact they are capable of having on the technology transfer process.

Another implication that this study might provide for management changes in the Forest Service is the need to facilitate the diffusion of innovations across Forest Service regions. Through more personal contact between personnel in information dispersal functions or personnel in basic management functions (i.e., recreation, timber harvest, fire control), the rate of spread of an innovation developed in one region to other regions could be increased. Special emphasis should be placed on sending personnel experienced in the use of a management innovation to training sessions and meetings in other regions to present information on the innovation. Also, cross-regional transfers of personnel in management positions should be encouraged.

Suggestions for Further Research

A primary need of future technology transfer research in the Forest Service is the need to substantiate the heavy reliance on local media channels in regions not adequately represented in this study. Also, this need exists for other types of innovations within all regions of the Forest Service. Before the diffusion process found to exist for Code-A-Site can be generalized to the diffusion process of other types

of innovations, preliminary research into characteristics of the innovations which might affect this process must be carried out. For example, it is possible that reliance on types of communication channels may differ substantially for recreation, timber harvest, and surveying innovations.

Another research topic of importance and interest to many is the complex exchange of information within the forestry scientific community as a whole. Examination of the diffusion process of an innovation such as Code-A-Site across all agencies and universities as well as the Forest Service would provide valuable insight into the entire system and its relevant components.

Seemingly of interest to the Forest Service and to the scientific community as well would be the development of additional variables and measurement techniques for indexing innovativeness within an individual. If more accurate evaluation of personal and situational characteristics of managers which correlate with innovative behavior can be developed, technology transfer in the Forest Service could be improved. By placing individuals who exhibit characteristics associated with innovativeness in such positions as the regional or forest information coordinator or line positions with direct land or user management responsibilities, the individuals may be more apt to exhibit the desired innovative behavior. This individual's innovativeness could be stifled through assignment to a supervisor lacking innovative characteristics and to a position with little or no opportunity to apply learned innovative technology.

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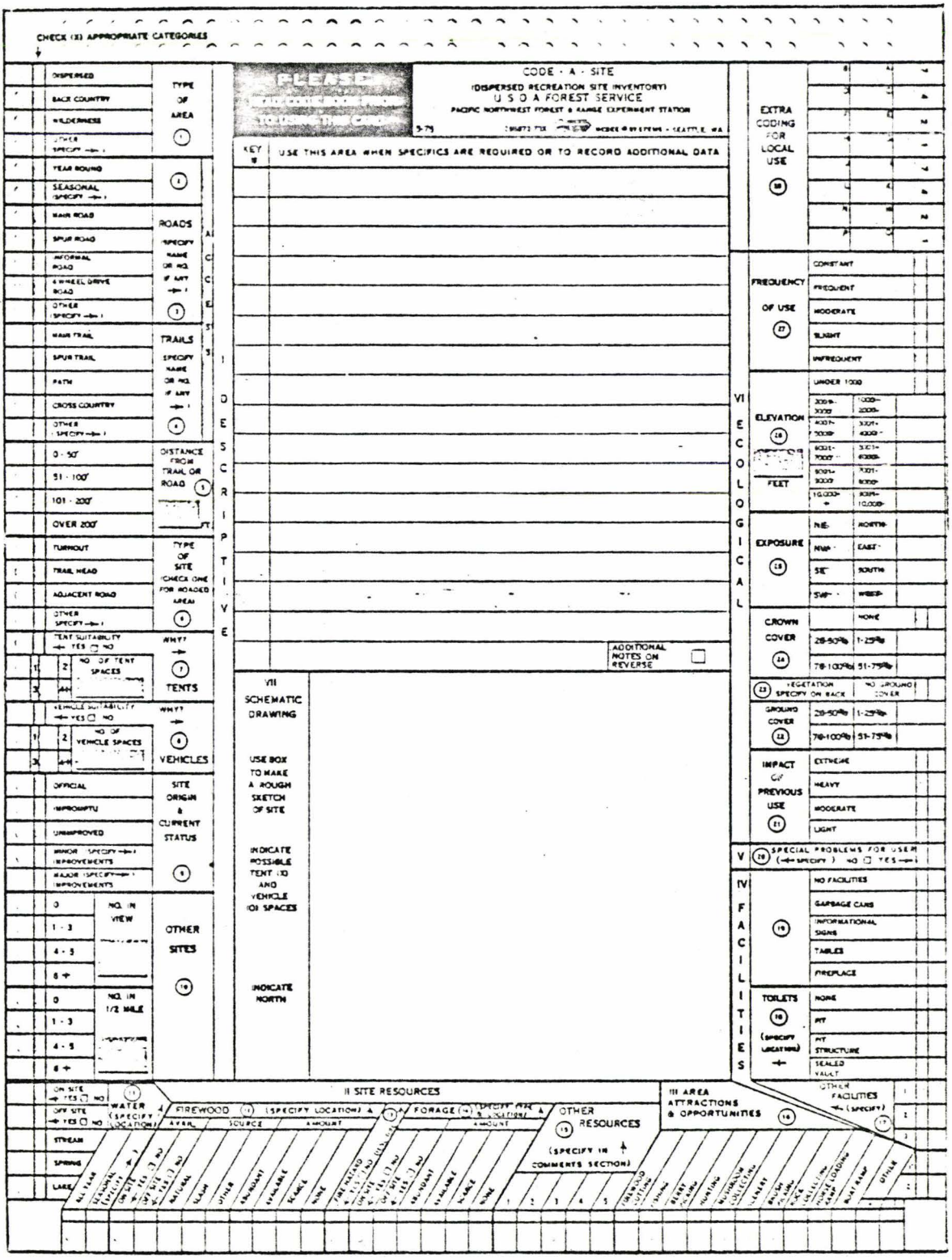
APPENDIX A

CODE-A-SITE INVENTORY CARD


CHECK (X) APPROPRIATE CATEGORIES
DISPERSED
BACK COUNTRY
WILDERNESS
OTHER
TYPE OF AREA
YEAR ROUND
SEASONAL
MAIN ROAD
SPUR ROAD
INFORMAL ROAD
4 WHEEL DRIVE ROAD
OTHER
ROADS
MAIN TRAIL
SPUR TRAIL
PATH
CROSS COUNTRY
OTHER
TRAILS
0 - 50'
51 - 100'
101 - 200'
OVER 200'
DISTANCE FROM TRAIL OR ROAD
TURNOUT
TRAIL HEAD
ADJACENT ROAD
OTHER
TYPE OF SITE
TENT SUITABILITY
YES NO
NO. OF TENT SPACES
TENTS
VEHICLE SUITABILITY
NO. OF VEHICLE SPACES
VEHICLES
OFFICIAL
IMPROMPTU
UNIMPROVED
MINOR IMPROVEMENTS
MAJOR IMPROVEMENTS
SITE ORIGIN & CURRENT STATUS
0
1 - 3
4 - 5
6 +
NO. IN VIEW
NO. IN 1/2 MILE
OTHER SITES
DESCRIPTIVE
CODE - A - SITE
(DISPERSED RECREATION SITE INVENTORY)
U S D A FOREST SERVICE
PACIFIC NORTHWEST FOREST & RANGE EXPERIMENT STATION
KEY #
USE THIS AREA WHEN SPECIFICS ARE REQUIRED OR TO RECORD ADDITIONAL DATA
ADDITIONAL NOTES ON REVERSE
VII SCHEMATIC DRAWING
USE BOX TO MAKE A ROUGH SKETCH OF SITE
INDICATE POSSIBLE TENT (X) AND VEHICLE (O) SPACES
INDICATE NORTH
EXTRA CODING FOR LOCAL USE
VI ECOLOGICAL
FREQUENCY OF USE
CONSTANT
FREQUENT
MODERATE
SLIGHT
INFREQUENT
ELEVATION
FEET
UNDER 1000
EXPOSURE
NE
NW
E
SE
SW
W
NORTH
EAST
SOUTH
WEST
CROWN COVER
NONE
1-25%
26-50%
51-75%
76-100%
VEGETATION SPECIFY ON BACK
NO GROUND COVER
GROUND COVER
IMPACT OF PREVIOUS USE
EXTREME
HEAVY
MODERATE
LIGHT
V SPECIAL PROBLEMS FOR USER (SPECIFY) NO YES
IV FACILITIES
NO FACILITIES
GARBAGE CANS
INFORMATIONAL SIGNS
TABLES
FIREPLACE
TOILETS
NONE
PIT
PIT STRUCTURE
SEALED VAULT
(SPECIFY LOCATION)
OTHER FACILITIES (SPECIFY)
II SITE RESOURCES
WATER
ON SITE YES NO
OFF SITE YES NO
STREAM
SPRING
LAKE
FIREWOOD
AVAIL.
SOURCE
AMOUNT
ALL YEAR
SEASONAL
NATURAL
LEASE
OTHER
UNLIMITED
LIMITED
AVAILABLE
SCARCE
NONE
FORAGE
OTHER RESOURCES
(SPECIFY IN COMMENTS SECTION)
III AREA ATTRACTIONS & OPPORTUNITIES
SWIMMING
SKIING
HUNTING
MUSHROOM COLLECTING
BOATING
CANOEING
CAMP LOADING RAMP
BOAT RAMP
OTHER

	TENS		UNITS	TENS		UNITS	TENS		UNITS		HUNDREDS	TENS	UNITS
	2 1	0	7 4 2 1	2 1	0	7 4 2 1	2 1	0	7 4 2 1	2 0	7 4 2 1	7 4 2 1	7 4 2 1
R	FOREST CODE			DISTRICT CODE			MGMT UNIT			S	SITE NUMBER		

REGION _____ FOREST _____ DISTRICT _____

TOWNSHIP _____ RANGE _____ SECTION _____ DOT ☐ MGMT UNIT _____ SITE NO. _____

DATE CODED _____ CODED BY _____

GENERAL DESCRIPTION OF SITE	
MANAGEMENT NOTES	
FUTURE MANAGEMENT RECOMMENDATIONS AND SITE COSTS	

KEY #	USE THIS AREA WHEN SPECIFICS ARE REQUIRED OR TO RECORD ADDITIONAL DATA
ⓐ	ON SITE VEGETATION
ⓐ	OFF SITE VEGETATION

APPENDIX B

FOREST SERVICE CODE-A-SITE ADOPTING UNITS

Region 1

Anaconda-Pintler Wilderness Area*

Bitterroot/Sula National Forest
- Districts: Darby*
  Stevensville*
  West Fork*

Clearwater National Forest
- Districts: Kelly Creek*
  Lochsa*
  Powell*

Deerlodge National Forest
- Districts: Butte*
  Deerlodge*
  Jefferson*

Flathead National Forest
- Mission Mountains Wilderness Area*
- Districts: Hungry Horse*
  Spotted Bear*
  Tally Lake*

Gallatin National Forest
- Districts: Gardiner*

Helena National Forest
- Districts: Helena/Canyon Ferry*
  Lincoln*

Idaho Panhandle National Forest
- Districts: Avery*
  Bonner's Ferry*
  Fernan*
  Priest Lake*
  Red Ives*
  Sandpoint*
  St. Maries*
  Wallace*

Kootenai National Forest*

Lewis and Clark National Forest
- Districts: Belt Creek*
  Rocky Mountain Front*

Lolo National Forest
- Districts: Missoula*
  Ninemile*
  Plains*
  Seeley Lake*
  Superior*
  Thompson Falls*

*Denotes adopting unit.

Region 1 (continued)

Nez Perce National Forest
  Districts: Clearwater*
             Moose Creek*

Region 2

Arapaho-Roosevelt National Forest*

White River National Forest
  Districts: Aspen*

Region 3

Cibola National Forest*

Coconino National Forest*

Coronado National Forest*

Gila National Forest
  Districts: Silver City*

Region 4

Bridge-Teton National Forest*

Region 5

Eldorado National Forest*

Klamath National Forest
  Districts: Ukonom*
             Salmon River*

Mendocino National Forest
  Districts: Corning*
             Covelo*

San Bernardino National Forest
  Districts: Arrowhead*
             Cajon*

Sequoia National Forest
  Districts: Tule River*

Shasta-Trinity National Forest
  Districts: Weaverville*

Sierra National Forest*

Tahoe National Forest*

---

*Denotes adopting unit.

Region 6

Deschutes National Forest
  Districts: Crescent*
  Fort Rock*

Gifford Pinchot National Forest
  Districts: Packwood*
  St. Helens*

Mt. Baker-Snoqualmie National Forest
  Districts: Baker River*
  Darrington*
  Glacier*
  Monte Cristo*
  North Bend*
  Skykomish*
  White River*

Mount Hood National Forest
  Districts: Bear Springs*
  Clackamas*
  Estacada*
  Zigzag*

Ochoco National Forest*

Siskiyou National Forest*

Umatilla National Forest
  Districts: Ukiah*
  Pomeroy*

Umpqua National Forest*

Wallowa-Whitman National Forest
  Eagle Cap Wilderness*

Wenatchee National Forest
  Districts: Chelon*
  Ellensburg*
  Entiat*
  Lake Wenatchee*
  Leavenworth*
  Naches*
  Tieton*

Willamette National Forest*
  Districts: Detroit*

Winema National Forest*

Region 10

Chugach National Forest*

*Denotes adopting unit.

APPENDIX C

FOREST SERVICE CODE-A-SITE NON-ADOPTING UNITS

Region	Forest	District	Position
1	Lewis and Clark	Judith	District Ranger
	Gallatin	Hebgen Lake	Resource Assistant
2	Nebraska	Fall River	District Ranger
	Grand Mesa	Grand Junction	Resource Assistant
	Rio Grande	Conejos	Resource Assistant
3	Gila	Reserve	Resource Assistant
	Tonto		Rec. Staff Officer
4	Payette		Rec. Staff Officer
	Humboldt	White Pine	Resource Assistant
	Salmon	Leadore	District Ranger
5	Modoc		Rec. Staff Officer
	Six Rivers	Gasquet	Resource Assistant
6	Umatilla	Dale	Resource Assistant
	Rogue River	Ashland	Resource Assistant
	Siuslaw	Mapleton	District Ranger
8	William B. Bankhead	Bankhead	Resource Assistant
	Tombigbee		Rec. Staff Officer
9	Wayne-Hoosier	Brownstone	District Ranger
	Monongahela	White Sulphur	Resource Assistant
	Ottawa		Rec. Staff Officer

APPENDIX D

ADOPTER TELEPHONE INTERVIEW SCHEDULE

TECHNOLOGY TRANSFER IN THE USFS

Code-A-Site User or Adopter: _____

Position: _____

Unit: _____

Address: _____

Region: _____

Method of Determination: _____

Initial Contact: Date: _____ Time & Date to Call Back (if not reached):

Time: _____ _____

Phone: _____ _____

Hi, this is Alan Watson. I'm calling from VPI in Blacksburg, Virginia, and we're working cooperatively with the Southeastern Forest Experiment Station on a study of technology transfer in the Forest Service. Specifically, we're looking at the spread of the Code-A-Site campsite inventory process. We're trying to determine how far it has spread and just how it came into use in the various Forest Service regions.

1. In a conversation with _____, he/she indicated that you apparently use Code-A-Site in your _____ (district, wilderness area, etc.). Is that right?

   Yes _____ Go to 3
   No _____ Go to 2

2. Has Code-A-Site ever been used on your area to your knowledge?

   YES _____ Go to 3
   NO _____ Go to 2a
   Not Sure _____ Would you like to check with someone to find out for sure? YES _____ When should I call back?

   _____ END.

   NO _____ Go to 2a

   2a. Okay, thank you very much, _____, and sorry to trouble you.

3. Could you tell me who initially decided to implement Code-A-Site (on your district)?

   SELF _____ Go to 4
   OTHER _____ Go to 3a

a. Name of other: _____

Current position: _____

Current location: _____

Locate adopter:

Phone: _____

Initial Contact: Date: _____

Time: _____

Time & Date to call back if not reached:

_____

b. Repeat introduction.

1. In a conversation with _____, he/she indicated that you were the apparent major influence in initiating Code-A-Site at _____. Is that right?

YES _____

NO _____ Well, who was? _____

4. We need your cooperation to help us learn how Code-A-Site spread from development by researchers to use in the field. I'd like to ask you a few questions about your involvement with Code-A-Site if that's possible. Can we discuss this now, or would you rather I called back at a more convenient time? (About 20 minutes time if subject asks)

NOW _____ Go to 5

LATER _____

a. Date: _____ Successful _____(to d)

b. Time: _____ Unsuccessful _____(to c)

c. Actual time and date of contact for interview: _____

d. Refresh respondent's memory of purpose of interview.

5. When did you actually begin to use Code-A-Site on this area? When was information first recorded on Code-A-Site cards? _____

6. Now I want you to think back and can you tell me how you first became aware of Code-A-Site? (see attached sheet 6b)

   Source: _____ Date: _____

   Comments:

7. After you had heard of Code-A-Site, where or to whom did you go to find out more about it before you decided to try it?

   Source: _____ Date: _____

   Comments: _____

   _____

   _____

   _____

8. Did Code-A-Site meet your expectations? Did you find it useful?

   _____

   _____

   _____

9. All right, now can you tell me if you are aware of anyone else in _____ National Forest who is using Code-A-Site or has used it?

   Name: _____

   Position: _____

   Unit: _____

   Name: _____

   Position: _____

   Unit: _____

Name: _____

Position: _____

Unit: _____

Name: _____

Position: _____

Unit: _____

Name: _____

Position: _____

Unit: _____

Name: _____

Position: _____

Unit: _____

Now, I'd like to ask you a little bit about yourself. This information could also help us understand how and why Code-A-Site has spread like it has. I can assure confidentiality of all information given.

10. First of all, how many years have you been with the Forest Service?

_____

11. Your current position? _____

12. And when did you move into this position? _____

13. Could you tell me your previous two positions with the Forest Service?

Position	Dates	Location
_____	_____	_____
_____	_____	_____

14. Now, let's see; when you decided to use Code-A-Site you were 11, 13a, 13b, other: _____

15. So, including summer experience, how many years have you actually worked in the recreation function for the Forest Service? _____ (Clarify recreation function if needed)

16. Okay, have you ever worked on a permanent basis in a natural resource-related field in private industry or other governmental agencies?

NO _____ Go to 17

YES _____ Proceed

a. Organization, years, positions:

Organization	Years	Positions

17. Do you have regular access to Forest Service Experiment Station publications? (probe: regions, how received, frequency utilized).

YES _____ PROBE

NO _____ Go to 18

18. a. Do you recall attending any professional conferences sponsored by professional groups during the last year?

YES _____ HOW MANY? _____ Outside your region? _____

NO _____

b. How about training workshops?

YES _____ HOW MANY? _____ Outside your region? _____

c. Have you attended any professional meetings in the last month?

YES _____ HOW MANY? _____ Outside your region? _____

NO _____

d. Did you go outside your National Forest for any other work-related purpose?

How about outside your region?

e. And how do these numbers compare to previous years? (ask for a,b,c+d)

a. Far more
b. Somewhat more
c. About the same
d. Somewhat fewer
e. Far fewer

19. Do you belong to any professional organizations or societies?

NO _____ Go to 20

YES _____ Proceed

a. What are they? _____

_____

_____

20. Do you receive any professional journals or magazines?

NO _____ Go to 21

YES _____ Proceed

a. What are they? _____

_____

_____

21. Would you tell me your current age? _____

22. And how about a little information on your professional education such as what degrees you have, and the areas of specialization of your major?

Degree	Major	Area of Specialization
_____	_____	_____
_____	_____	_____
_____	_____	_____

That's all that I have to ask you. I appreciate your time and cooperation, and if you would like a copy of our study findings, I will see that you get one. Would you be interested?

YES _____

NO _____

Okay, thank you very much.

---END---

6b. a. Person (name, position, unit, location, circumstances)

b. F.S. publication (circumstances, authors)

c. Journal (circumstances, name, authors)

d. Workshop (circumstances, location, person)

e. University coursework (university, circumstances, persons)

f. Field trip (sponsor, circumstances, location)

g. Slide-tape (location, circumstances, developer)

APPENDIX E

NON-ADOPTER INTERVIEW SCHEDULE

TECHNOLOGY TRANSFER IN THE USFS

Non-Adopter: _____

Position: _____

Unit: _____

Address: _____

Region: _____

Initial Contact: Date: _____ Time & Date to Call Back (if not reached): _____

Time: _____

_____

Phone: _____

Hi, my name is _____ and I'm calling from VPI in Blacksburg, Virginia. I'm working on a research project cooperatively with the Southeastern Forest Experiment Station that I'd like to talk to you about for a few minutes if you've got the time. (He/she agrees.) Okay, good. Now, this is a study of technology transfer. Technology transfer in the Forest Service is studying the spread of new ideas and new management techniques through the Forest Service both vertically from the regions to national forests and districts as well as laterally across regions, forests, and districts to people in management positions like your own who can implement these new techniques.

I chose your name at random from a list of _____(position) in your region and am interested in learning specifically what ways you come in contact with new management practices. I will then compare this information with that of others in the Forest Service in positions similar to yours. Hopefully, this information will help the Forest Service better understand how management ideas are picked up on and point out the best way to introduce new ideas to the people who can use them.

Now, what I have is about a 15-minute, kind of a semi-structured interview asking some direct questions looking for some direct responses to give me the information I need for this study. I can make an appointment with you to do this, or we could do it now. What's good for you?

NOW _____

LATER _____ Date: _____

Time: _____

(If unsuccessful at later appointment, record date and time of actual interview: _____).

First of all, I'm going to ask you about one specific management innovation that I'm studying in depth to better understand how it specifically has spread through the USFS.

1. Could you tell me if you are familiar with the Code-A-Site campsite inventory system?

   YES _____ Proceed

   NO _____ Go to 6

2. Could you tell me about when and how you first heard about CAS?

   Source: _____ Date: _____

   Comments: _____

   _____

   _____

   _____

3. After you became aware of CAS, I'd be interested in knowing what other sources of information you came into contact with concerning CAS. Were there any that come to mind?

   Source: _____ Date: _____

   Comments: _____

   _____

   _____

   _____

4. Could you tell me in your estimation why CAS has not been used on your district/NF? (if applicable)

5. Are you aware of anyone on your national forest that is using or has used CAS?

_____

_____

_____

_____

6. Do you have regular access to Forest Service Experiment Station publications? (probe: regions, how received, frequency utilized).

YES _____ PROBE

NO _____ Go to 18

7. a. Do you recall attending any professional conferences sponsored by professional groups during the last year?

YES _____ HOW MANY? _____ Outside your region? _____

NO _____

b. How about training workshops?

YES _____ HOW MANY? _____ Outside your region? _____

c. Have you attended any professional meetings in the last month?

YES _____ HOW MANY? _____ Outside your region? _____

d. And how do these numbers compare with previous years? (ask for a,b,c)

a. Far more
b. Somewhat more
c. About the same
d. Somewhat fewer
e. Far fewer

8. Do you belong to any professional organizations or societies?

NO _____ Go to 9

YES _____ Proceed: What are they?_____

_____

9. Do you receive any professional journals or magazines?

   NO _____ Go to 10

   YES _____ Proceed: What are they? _____

   _____

   _____

10. How many years have you been with the Forest Service? _____

11. Your current position? _____

12. And when did you move into this position? _____

13. Could you tell me your previous two positions with the Forest Service?

Positions	Dates	Locations
_____	_____	_____
_____	_____	_____

14. So, including summer experience, how many years have you actually worked in the recreation function for the Forest Service? _____ (Clarify "recreation function" if needed.)

15. Okay, have you ever worked on a permanent basis in a natural resource-related field in private industry or other governmental agencies?

    NO _____ Go to 16

    YES _____ Proceed

Organization	Dates	Position
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

16. Would you tell me your current age? _____

17. And how about a little information on your professional education such as degrees you have, and the areas of specialization of your major?

Degree	Major	Area of Specialization
_____	_____	_____
_____	_____	_____
_____	_____	_____

That's all I have to ask you. I appreciate your time and cooperation, and if you would like a copy of our study results, I will see that you get one. Would you be interested?

YES _____ NO _____

Okay, thank you very much.

---END---

CLARIFICATIONS:

#2: If person: Name, location, situation.

#3: Publication: How they got it (ordered it, circulated, received it in training session). Clarify as much as possible what the publication is.

Training: Where it was, record their remembered "title" of session, how they came to be there and when.